

THE

## VETERINARY BULLETIN

Vol. 29]

November, 1959

[No. 11]

## DISEASES CAUSED BY BACTERIA AND FUNGI

NEGRETTI, F. (1959). A new method for the diagnosis of mastitis: the antiformin test.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 193-194. **3350**

By mixing one part of Antiformin with 5 parts of milk and observing for flocculation after 20 min., 13·2% more positive results than by the Whiteside test using sodium hydroxide were detected in 2,500 examinations of milk for mastitis.—A. ACKROYD.

ELLIOTT, S. D. & BARNES, E. M. (1959). Changes in serological type and antibiotic resistance of Lancefield group D streptococci in chickens receiving dietary chlortetracycline.—*J. gen. Microbiol.* 20, 426-433. [Authors' summary modified.] **3351**

In the controls, in which only chlortetracycline-sensitive streptococci were present initially, *Streptococcus faecium* predominated and *Str. faecalis* (mainly the proteolytic variant) was present in small numbers representing three serological types (Types H69 D5, D15 and D76). Administration of chlortetracycline, whether at a low concentration throughout life or intermittently at a high concentration, led to the emergence of a highly resistant non-proteolytic strain of *Str. faecalis* (Type H69 D5) which became predominant in the treated birds. After withdrawal of chlortetracycline this type disappeared and Types D15 and D76 (which were proteolytic) reappeared. Type D15 remained sensitive to chlortetracycline, but Type D76 had become more resistant and eventually became the predominant streptococcus in all the chickens under observation. The serological types of *Str. faecalis* identified in these chickens are also commonly found in the human intestine.

PRIDHAM, T. J. & THACKERAY, E. L. (1959). The isolation of a streptococcus, Lancefield's

group D, from nutria.—*Canad. J. comp. Med.* 23, 81-83. [Summary in French.] **3352**

Diseases of nutria in Canada are catalogued. A sporadic infection caused by *Streptococcus durans* on a number of ranches with both local and generalized infections has been observed. The laboratory and bacteriological studies are reported in detail.

—R. V. L. WALKER.

KVITRUD, A. & LYSNE, I. (1959). Noen undersøkelser over mastitis hos sau. [Mastitis in ewes.]—*Nord. VetMed.* 11, 129-140. [In Norwegian. Summaries in English and German.] **3353**

Udder secretion from 72 ewes with mastitis was examined bacteriologically: *Staph. aureus* was isolated from 47 cases, coli bacilli from 9, pasteurella (mostly *Past. haemolytica*) from 8 and *Str. uberis* from 2. —R.M.

LEISE, J. M., CARTER, C. H., FRIEDLANDER, H. & FREED, S. W. (1959). Criteria for the identification of *Bacillus anthracis*.—*J. Bact.* 77, 655-660. [Authors' summary modified.] **3354**

Evidence was presented that *B. anthracis* could be identified and differentiated from *B. cereus* and other spore-formers by a positive "string-of-pearls" reaction and a positive reaction with gamma bacteriophage. The absence of motility and haemolysis, and a characteristic morphology on blood or nutrient agar media support the identification of *B. anthracis*.

No motile or haemolytic strains of *B. anthracis* were found. Non-*B. anthracis* spore-formers were generally motile and haemolytic. All strains of *B. anthracis* gave positive "string-of-pearls" and bacteriophage susceptibility reactions, whereas all of the other strains

gave negative reactions. Virulent strains of *B. anthracis* produced mucoid colonies on bicarbonate agar incubated in CO<sub>2</sub>; the other strains never showed mucoid colonies in CO<sub>2</sub>, when the colonies were rough in air.

The necessity for quantitative virulence determination was indicated and its value in the identification of *B. anthracis* discussed. In 44 avirulent mutants derived from 44 virulent strains of *B. anthracis*, no change occurred in motility, haemolysis, "string-of-pearls" effect, and bacteriophage susceptibility.

*B. anthracis* is not therefore a variety of *B. cereus* and should not be classified as such. Virulent or avirulent *B. anthracis* can be differentiated from *B. cereus*.

LOSTIA, G. B. (1958). Sul tempo di capsulazione di *B. anthracis* in terreno al siero glucosato. [Capsulation time of *B. anthracis* in glucose serum medium.]—*G. Batt. Virol. Immun.* 51, 138-148. [Summaries in English, French and German.] **3355**

Capsule formation started at the first hour of incubation in a medium containing 2% serum glucose. It is considered that this occurs during the vegetative phase of active luxuriant growth as well as during sporulation.

—T.E.G.R.

RUOSCH, W. (1959). Bovine Tuberkulose in einer afrikanischen Ranch. [Bovine tuberculosis on a ranch in the Belgian Congo.]—*Schweiz. Arch. Tierheilk.* 101, 203-215. [Summaries in English, French and German.] **3356**

On a ranch of 9,000 cattle, the incidence of reactors to the tuberculin test was reduced in 4 years from 6·5% to 1·86% by the isolation and slaughter of the reactors. In all, 1,089 were slaughtered. The initial incidence was higher in cattle driven into kraals at night than in those remaining at liberty (8·9% compared with 3·4%). Primary lesions were more frequent in the digestive system, in particular the retropharyngeal lymph nodes, than in the respiratory system. It is considered that salt troughs were important in spreading the disease. The author mentions that a high number of tuberculin reactions became necrotic.—M.G.G.

GRYS, S. (1959). Investigation upon the estimation of the degree of development of a disease process in cattle infected in natural manner with tubercle bacillus of bovine type and upon the degree of immunity in cattle injected with *Mycobacterium tuberculosis*

*typus murinus (vole bacillus)*.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 695-697. **3357**

Two formulae, an M coefficient indicating the degree of development of a tuberculous process and an I coefficient giving information on the degree of immunity, were derived from statistical analysis of the results of an investigation into the blood chemistry and serological reactions of 87 cows with TB. and 16 healthy heifers experimentally infected with the vole bacillus and subsequently challenged with virulent tubercle bacilli. Although the M coefficient is not always equivalent to the lesions found P.M., a two- to threefold increase in value strongly indicates the probability that the disease has become generalized.

—A. ACKROYD.

SCHELLNER, H. (1959). Untersuchungen über die Lebensfähigkeit von Tuberkelbakterien des Abwassers auf beregneten Weideflächen. [Viability of tubercle bacilli in waste water used for spraying pastures.]—*Rindertuberk. u. Brucellose* 8, 51-60. **3358**

Pastures were sprayed at the rate of 200 litres per hectare with water containing minced tuberculous udder tissue and, after a period of 7, 14, or 21 days, were grazed by 56 tuberculin-negative calves for 42 days. Two of the 14 calves that began grazing 7 days after spraying developed TB. It is concluded that pastures sprayed with waste water free from particulate matter will not infect cattle with TB. after 14 days.—M.G.G.

SOBIECH, T. (1959). The value of biological sterilisation of manure in TB. cases with cattle.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 701-702. **3359**

In earth-covered manure heaps approximately 5 ft. × 6 ft. × 5 ft. high containing (1) 25% of cattle and 75% of horse manure or (2) 50% of each, virulent tubercle bacilli survived for 3 weeks, whilst in a heap (3) composed of 75% cattle and 25% horse manure, they remained virulent for 8 weeks. Bacilli in excreta on the ground under natural conditions were still virulent after 12 weeks. Temperatures in the heaps decreased in (1) from 70° to 39° in one week and in (3) from 41° to 30°. After 5-7 weeks, temperatures stabilized in all the heaps between 3° and 9°C. Minimum air temperatures varied between 8° and -11°C.—A. ACKROYD.

KITAZAWA, Y. & OHTA, S. (1959). Investigation of the influence of antimicrobial drugs on the allergic reaction to reinfection tuberculosis

**in rabbits.**—*Amer. Rev. Tuberc.* **79**, 329-338. [Summaries in French and Spanish. Authors' summary modified.] **3360**

When rabbits were re-infected with *Mycobacterium tuberculosis*, of which growth ability had been weakened by PAS or isoniazid, or with resistant bacilli, of which growth ability had been weakened by keeping in water, their reactions to tuberculin decreased. On the other hand, in primary infections caused by bacilli treated with water or streptomycin, the hypersensitive reaction was weaker than in infections caused by untreated bacilli. Primary infection with any of these treated bacilli gave a milder infection than with living bacilli, showing that pathogenicity decreased. However, although the decrease of growth ability and the decrease of antigenicity were parallel, antigenicity was retained by bacilli killed with heat.

FONG, J., CHIN, D., AKIYAMA, H. J. & ELBERG, S. S. (1959). Studies on tubercle bacillus-monocyte relationship. III. Conditions affecting the action of serum and cells. Modification of bacilli in an immune system.—*J. exp. Med.* **109**, 523-543. [Abst. from authors' summary.] **3361**

Studies of the relationship of protective serum factor (p.s.f.) to cellular resistance and to tuberculin skin sensitivity demonstrated that p.s.f. may exist independently of a high level of cellular resistance, and that both p.s.f. and cellular resistance may be demonstrable without a delayed type hypersensitivity.

Experiments with adsorbed sera and the globulin fraction of immune serum indicated no specific association of p.s.f. with antibody globulin.

The p.s.f. in immune serum was thermostable and non-dialysable.

Virulent tubercle bacilli after exposure *in vitro* to immune serum from B.C.G.-immunized animals, retained their capacity to destroy monocytes and to proliferate intracellularly.

Normal and immune monocytes cultivated *in vitro* in normal or immune serum retained their native susceptibility or resistance.

Immune monocytes manifested effective resistance to virulent tubercle bacilli only in the continuous presence of immune serum.

Virulent tubercle bacilli after intracellular passage in an immune system (immune monocytes cultivated in immune serum), had a decreased potential for destruction of normal monocytes cultivated in immune serum.

FRAPPIER, A., PORTELANCE, V. & ST.-PIERRE, J. (1959). Some biologic properties of mycobacteria following the extraction of lipids. The power to initiate acquired resistance.—*Amer. Rev. Tuberc.* **79**, 296-306. [Summaries in French and Spanish. Authors' summary modified.] **3362**

Massive, repeated doses of heat-killed B.C.G. or H37Rv residues prepared with rapid lipid extraction induced allergy and protection in g. pigs. Massive doses of B.C.G. residues submitted to a prolonged process of lipid extraction induced a low and irregular degree of allergy and gave only slight protection. Small doses of acetone-extracted B.C.G. prepared by the same prolonged process of extraction seemed to enhance experimental TB., although sensitizing no more than 22% of the animals to tuberculin. A filtrate of an old B.C.G. culture, as well as a borate extract (mostly of protein nature) of mechanically disrupted B.C.G., far from immunizing g. pigs, seemed to enhance the disease.

LARSEN, A. B. & VARDAMAN, T. H. (1959). A comparison of various diagnostic tests with microscopic post-mortem findings in cattle infected with Johne's disease.—*Proc. 62nd Ann. Meet. U. S. Livestock Sanit. Ass., Florida*, 1958 pp. 163-166. [Authors' summary modified.] **3363**

Intradermal and serological tests were carried out for 2 years at intervals of 3-4 months in a herd of 190 cattle, many of which were infected with Johne's disease.

About 15% of the cattle had i/d johnin reactions large enough to be considered positive; 50% reacted to the haemagglutination test, 75% to the haemolytic modification of the haemagglutination test, and 50% to the complement-fixation test. The i/d test was the method of choice based on P.M. findings. However, it leaves much to be desired since several animals negative to the i/d test were found infected when examined P.M.

85% of the animals reacting to the i/d test before they reached one year of age lost their sensitivity within 15 months, as compared with 48% of adult reactors during the same period.

KNCHSPERGER, G. (1959). Zur Diagnostik der Paratuberkulose. [Diagnosis of Johne's disease.] — *Schweiz. Arch. Tierheilk.* **101**, 180-185. [Summaries in English, French and Italian.] **3364**

Hole's c.f. test was performed on 93 blood samples from unsuspected herds with negative

results, and on 91 blood samples from a district where Johne's disease occurs with 4 positive results. Of 204 cattle with suspected clinical Johne's disease, 72 were positive to the c.f. test; 51 of these 72 were slaughtered and microscopic examination of the intestine confirmed the diagnosis in 50. P.M. examination of 16 of the negative cattle was positive in one. In a herd with endemic Johne's disease 27 clinically healthy cattle underwent both the c.f. and allergic tests; 14 were positive or doubtful to the allergic, but only 2 were positive to the c.f. test. Of these 2, one developed Johne's disease 6 months later. Of 17 cattle with clinical Johne's disease only 5 reacted to the allergic test. It is concluded that the c.f. test is a reliable method of diagnosing Johne's disease, whereas the allergic test is positive in cattle that have been in contact with the organism but may not develop the disease.

—M.G.G.

RICE, C. E., ANNAU, E. & DUHAMEL, L. (1959). *Studies of Johne's disease in Canada. VI. An attempt to passively transfer sensitivity to johnin by means of plasma fractions.* — *Canad. J. comp. Med.* **23**, 59-64. [Summary in French.] **3365**

Alpha and gamma globulin plasma fractions of g.pigs and calves sensitized with Johne's bacilli and avian tubercle bacilli were inoculated intraperitoneally into normal g.pigs. In three studies no evidence could be adduced to demonstrate the passive transference of sensitivity to johnin P.P.D. or avian tuberculin in these g.pigs.—R. V. L. WALKER.

SCHÜTZLER, H. (1959). Weitere Beobachtungen zum Auftreten von Rotlaufarthritis in einer Cornwall-Schweinezucht. [*Arthritis associated with swine erysipelas.*] — *Dtsch. tierärztl. Wschr.* **66**, 61-64. [Summary in English.] **3366**

Arthritis which developed in pigs 2 weeks after vaccination with adsorbate vaccine against swine erysipelas was attributed to allergy to the organism.—M.G.G.

KALICH, J. & MERKENSCHLAGER, M. (1959). *Antibiotikabeifütterung und Rotlauftherapie.* [*Antibiotic food supplements and treatment of swine erysipelas.*] — *Tierärztl. Umsch.* **14**, 177-180. **3367**

Fifteen pigs were fed a ration containing chlortetracycline and 15 a ration free from the antibiotic. Both groups were then infected orally with *Erysipelothrix rhusiopathiae*, 10 in

each group while under stress in climatic chambers. 17 of the pigs subjected to stress developed erysipelas, 8 of which had been fed chlortetracycline, and 9 the control ration. They recovered after treatment with penicillin, tetracycline or swine erysipelas immune serum. The antibiotics acted more quickly than the immune serum. The strain of *E. rhusiopathiae* was re-isolated from the faeces of the pigs fed chlortetracycline and showed no increase in resistance to the antibiotic *in vitro*.—M.G.G.

BUT'YANOV, D. D. (1958). [*The phagocytic reaction in swine erysipelas.*] — *Uchen. Zap. Vitebsk. vet. Inst.* **16**, No. 1 pp. 33-37. [In Russian.] **3368**

B. concluded that specific phagocytosis was one of the most important factors in immunity to swine erysipelas. While there was no phagocytosis of erysipelas bacilli in non-immune rabbits and cattle, it did occur in non-immunized pigs. After immunizing there was a sharp rise in phagocytic activity in all three species. Phagocytic activity was high in pigs which had recovered from infection and infected pigs which had been treated with immune serum or penicillin. Washed leucocytes retained their phagocytic activity.—R.M.

JASTRZĘBSKI, T. (1959). *Adjuvantia-wpływ dodatku oleju parafinowego z lanolina i lipidów Mycobacterium tuberculosis na zdolność uodparniające szczepionki Stauba u myszy przeciwko różcy świń.* [*Effect of liquid paraffin, lanolin and lipoids of tubercle bacilli on the immunizing property for mice of swine erysipelas vaccine.*] — *Ann. Univ. M. Curie-Skłodowska Sect. DD.* **1957 12**, 29-40. [In Polish. Summaries in English and Russian.] **3369**

The addition of liquid paraffin, alone or with lanolin and lipids of tubercle bacilli, to the avirulent Staub's swine erysipelas vaccine lowered appreciably its immunizing property for mice. The repetition of the experiment on pigs is suggested by the author.

—M. GITTER.

UGORSKI, L., KAMIŃSKI, J. & STROJNA, S. (1959). *Przypadek listeriozy u koni.* [*Listeriosis in horses.*] — *Med. Wet., Warszawa.* **15**, 153-156. [In Polish. Summaries in English and Russian.] **3370**

The authors isolated *Erysipelothrix (Listeria) monocytogenes* from the liver, kidneys and spleen of 2 horses which died after 6-7 days' illness. The clinical symptoms

were anorexia, thirst, loss of condition, ataxia, collapse and death. Two other horses in the same stable were unaffected and on blood agglutination test had titres of 1:160 and 1:320; the blood of the owner gave a titre of 1:20. Agglutination tests on blood samples from 182 clinically normal horses from different parts of Poland gave titres between 1:180 and 1:320. The authors concluded that normal equine serum can agglutinate *E. monocytogenes* up to the titre of 1:160 to 1:320.—M. GITTER.

CORDY, D. R. & OSEBOLD, J. W. (1959). The neuropathogenesis of listeria encephalomyelitis in sheep and mice.—*J. infect. Dis.* **104**, 164-173. [Authors' summary modified.] **3371**

Neuropathological examination of 15 cases of ovine listeria encephalomyelitis indicated that lesions first developed in association with the smallest vessels. These typical parenchymal foci showed a progressive parallel increase in bacteria, necrosis and neutrophiles. Vasomeningeal lesions had fewer neutrophiles and occasional bacteria. Parenchymal lesions were most extensive and severe in the depths of the brain stem in and about the reticular formation. These lesions bore no relationship to meningeal or ependymal surfaces nor to cranial nerve roots.

Similar lesions appeared in about a third of mice inoculated by various routes. Again, involvement of the brain was haematogenous rather than by extension from adjacent structures. Encephalitis appeared in this more susceptible host chiefly in those that avoided or survived a systemic disseminated infection.

DHANDA, M. R., LALL, J. M. & SETH, R. N. (1958). Immunological studies on *Pasteurella septica*. II. Further trials on adjuvant vaccine.—*Indian J. vet. Sci.* **28**, 139-156. [Authors' summary modified.] **3372**

A procedure for the manufacture and standardization of haemorrhagic septicaemia adjuvant vaccine is submitted. Field and laboratory trials showed that it is absolutely safe for cattle and buffaloes of all ages and that in immunizing properties it is far superior to the broth vaccine. The protective properties did not deteriorate for at least a year during storage at room temperatures ranging from -2.2°C. to 29.5°C. The vaccine can also withstand fairly high temperatures and can be transported by rail and road for journeys lasting ten days in the hot summer months. An

immunity test in 5 animals vaccinated 9 months and 21 days previously showed that they were all solidly immune.

CARTER, G. R. (1959). Studies on *Pasteurella multocida*. IV. Serological types from species other than cattle and swine.—*Amer. J. vet. Res.* **20**, 173-175. **3373**

Of 257 strains of *Past. septica* from various animals and birds, 99 could be clearly typed by the indirect haemagglutination test. Of these, 62 were identified as Type A, 14 as Type B and 23 as Type D. All except 2 of the Type B strains were from buffaloes with acute pasteurellosis. The other types were recovered from a variety of diseases. Type A strains predominated as the cause of acute fowl cholera. There were indications of the existence of another major group, designated Type C, occurring most frequently in dogs and cats. Strains which appeared most pathogenic and were associated with definite disease processes were mostly typable.—A. ACKROYD.

NIKIFOROVA, N. M. & GREZIN, V. F. (1959). [Antibiotics against fowl cholera.]—*Veterinariya, Moscow* **36**, No. 4 pp. 61-63. [In Russian. Summary in English.] **3374**

The authors confirmed the superiority of i/m injections of oxytetracycline over other antibiotics for the treatment of fowl cholera. The recommended dosage was 10-40 mg. once daily for 3 days. The minimum effective oral dose was 60 mg. [See also *V.B.* **26**, 359.]

—R.M.

HIGUCHI, K., KUPFERBERG, L. L. & SMITH, J. L. (1959). Studies on the nutrition and physiology of *Pasteurella pestis*. III. Effects of calcium ions on the growth of virulent and avirulent strains of *Pasteurella pestis*.—*J. Bact.* **77**, 317-321. [Authors' summary modified.] **3375**

A factor in milk which promoted the growth of virulent strains of *Past. pestis* at 37°C. was identified as the calcium ion.

Virulent strains required 0.002 to 0.004 M calcium ions for growth at 37°C. in the basal synthetic medium containing 0.02 M magnesium salt: avirulent strains grew without added calcium, but required it when the magnesium content was reduced to 0.0025 M. The loss in virulence of *Past. pestis* upon serial transfer in aerated liquid medium at 37°C. was prevented by the presence of calcium salts. Strontium and zinc salts were able to replace

calcium in the growth medium. Antagonism of magnesium for calcium was indicated in the growth of virulent strains at 37°C.

MUYSSON, J. R. & CARTER, G. R. (1959). The antibiotic sensitivity in vitro of *Pasteurella hemolytica* and four serological types of *Pasteurella multocida*.—*Canad. J. Microbiol.* **5**, 122-124. 3376

Antibiotics were used in dilutions to determine the minimal inhibitory concentration on *Past. haemolytica* and four serological types of *Past. septica*. No significant difference was observed in antibiotic sensitivity of *Past. septica* and the range was essentially the same for *Past. haemolytica* except that bacitracin sensitivity appeared greater. Except for bacitracin and viomycin the antibiotics tested were effective against both species.

—R. V. L. WALKER.

DELWICHE, E. A., FUKUI, G. M., ANDREWS, A. W. & SURGALLA, M. J. (1959). Environmental conditions affecting the population dynamics and the retention of virulence of *Pasteurella pestis*: the role of carbon dioxide.—*J. Bact.* **77**, 355-360. [Authors' summary modified.] 3377

Studies on the growth characteristics of *Past. pestis* at 37°C. in air and under nitrogen and in the presence of CO<sub>2</sub> (bicarbonate), aspartic acid or glutamic acid, revealed the following. (a) Under aerobic conditions the avirulent cells in an inoculum are capable of outgrowing the virulent cells; (b) in the absence of oxygen (under N<sub>2</sub>) the virulent cells in the inoculum can grow at least as rapidly as the avirulent cells, and the culture retains virulence; (c) carbon dioxide suppresses the initial rate of growth in air of both virulent and avirulent cultures, but the virulent cells continue to proliferate, with the end result that the initial ratio of virulent to avirulent cells is held approximately constant, and the culture retains virulence; (d) aspartic or glutamic acids contribute toward the retention of virulence in a manner which may or may not be related to the CO<sub>2</sub> effect.

The favourable effect of CO<sub>2</sub> (bicarbonate) on the retention of virulence is interpreted in terms of CO<sub>2</sub> inhibition of terminal oxidative mechanisms with consequent selective inhibition of avirulent cells and competitive growth of virulent cells within the initial inoculum.

GEURDEN, L., DEVOS, A. & VAN DEN WYN-GAERT, M. (1959). Voortgezette onderzoeken-

gen omrent klebsiella's. [Further studies on klebsiella.] — *Vlaams diergeneesk. Tijdschr.* **28**, 161-169. [In Flemish. Summaries in English, French and German.] 3378

The authors summarized the biochemical properties of 21 strains of klebsiella described in 1957 and 14 new strains. The strains included 10 from the lungs of chicks with pullorum disease; 5 from the urine of dogs with nephritis; 3 from the uterus of sows with puerperal sepsis; 3 from liver or intestine of ducks; 4 from the faeces of human beings with enteritis; one from an aborted bovine foetus.

—R.M.

TERPSTRA, J. I. & AKKERMANS, J. P. W. M. (1959). Haemolytical colibacteria as a cause of pig disease.—*Proc. XVIth Int. vet. Congr.*, Madrid **2**, 527-528. 3379

Haemolytic *E. coli* were isolated from the contents of the small intestines of 67 pigs which had oedema of the bowel or disorders of the stomach and intestines; the organism seems to be a frequent cause of disease in pigs in the Netherlands. Experimentally and under natural conditions, acute, frequently fatal gastro-enteritis or a chronic retardation of growth has been associated with the excretion of large numbers of haemolytic *E. coli* in litters of pigs. Intravenously extracts of various strains induced oedema of the bowel, and other lesions in pigs; dosage and the potency of the toxin affected the clinical picture. Of 226 strains, 145 were identified with antisera as E<sub>4</sub>, E<sub>57</sub>, E<sub>68</sub>, or G<sub>7</sub> strains. Not every bacterial type gave rise to the same clinical picture.—A. ACKROYD.

GOLDBERG, H. S., GOODMAN, R. N. & LANNING, B. (1959). Low-level, long-term feeding of chlortetracycline and the emergence of antibiotic-resistant enteric bacteria. In "Antibiotics annual 1958-1959" pp. 930-934. [New York: Medical Encyclopedia Inc.] 3380

Increased resistance to chlortetracycline was not demonstrable in the coliform organisms from mice that had been fed the antibiotic for several months at 20 to 40 µg. per mouse per day. Some resistance did occur with lactose-negative enteric organisms (*Proteus*, *Pseudomonas*) but the percentage was low when compared with the streptomycin results. In rabbits fed for 12 weeks spinach treated with chlortetracycline as a preservative (intake 250 µg. chlortetracycline residue), blood serum levels of chlortetracycline did not approach therapeutic levels.—F. R. PAULSEN.

GILLIES, N. E. & ALPER, T. (1959). Reduction in the lethal effects of radiations on *Escherichia coli* B by treatment with chloramphenicol.—*Nature, Lond.* **183**, 237-238. 3381

The lethal effects of X-rays and ultra-violet light were greatly reduced when *Escherichia coli* B were incubated for a period after irradiation on solid medium containing 5 µg./ml. of chloramphenicol, especially if irradiation was carried out in anoxic conditions. Survival could be still further increased if irradiation was followed by a preliminary period of up to 1 hour's incubation on nutrient agar before commencement of the chloramphenicol treatment. Virtually all the effects of 50 ergs/mm. of u.v. light appeared to be due to a metabolic disturbance, the effects of which may be counteracted by the inhibitory action of chloramphenicol. A smaller fraction of the overall effect of X-rays is attributable to the metabolic disturbance. No post-irradiation treatment reported hitherto has been as effective in reducing the sensitivity of bacteria to X-rays.—A. ACKROYD.

DUNNE, H. W. (1959). An expanding concept of colibacillosis with emphasis on the disease in swine.—*Canad. J. comp. Med.* **23**, 101-104. 3382

For many years colibacillosis was synonymous with diarrhoea of the new-born but little was known of the organism which under certain conditions became highly invasive and frequently produced a fatal infection. *Escherichia coli* was originally regarded as a normal inhabitant of the digestive tract and when this organism was isolated after death it was usually looked upon as a secondary factor rather than as an actual pathogen. More recently research has led to the identification of various strains of *E. coli* through classification of serological types based on O, K and H antigens. Enterotoxaemia of swine is now dealt with largely on the basis of the isolation and classification of *E. coli*, and mention is made of the practical use of immune serum in therapy.—R. V. L. WALKER.

ROY, J. H. B., SHILLAM, K. W. G., HAWKINS, G. M., LANG, J. M. & INGRAM, P. L. (1959). The effect of white scours on the sodium and potassium concentration in the serum of newborn calves.—*Brit. J. Nutr.* **13**, 219-226. [Authors' summary modified.] 3383

Sodium and potassium determinations were made on the serum of 152 calves during the first 3 weeks of life.

Forty calves were deprived of colostrum, 102 received 400 ml. and ten were given 6 pints (3,410 ml.) colostrum. All were reared on whole milk or on a 'synthetic milk', based on dried skim milk, at the rate of 1 lb. milk per 10 lb. live weight.

111 calves survived the experimental period. With increasing incidence of scouring, the fall in serum-sodium values after birth became greater with a concomitant but slight rise in potassium values.

Of the 41 calves that died, P.M. examination revealed *Escherichia coli* septicaemia in 12 and a localized intestinal infection with *E. coli* in 28. The values for serum sodium and potassium of the 12 dying from *E. coli* septicaemia were similar to those of calves that scoured but recovered.

The serum-sodium values of the 28 calves with the localized infection were similar to those of the 12 dying from septicaemia, but the serum-potassium values of the former calves increased after birth until the time of death.

The possibility is discussed that calves, whose deaths are associated with a localized intestinal infection with *E. coli* may succumb to cardiac arrest as a result of the high concentration of potassium in the serum.

KHERA, S. S. & DHANDA, M. R. (1958). Gastro-enteritis in young calves. I. *Salmonella* infected cases.—*Indian J. vet. Sci.* **28**, 117-132. [Authors' summary modified.] 3384

Of 191 calves that died within 3 months of birth and showed gastroenteritis P.M., infection with *Salmonella* was encountered in 74. The types isolated were: *S. dublin* from 45 cases, *S. typhi-murium* from 11, *S. enteritidis* from 4, *S. weltevreden* from 5, *S. newport* from 2, *S. richmond* from 2 and *S. chester, pomona, nchanga, butantan* and *hwittingfoss* from one each. Faecal samples from 100 cows and 100 buffaloes at one farm and 100 buffaloes at another were examined. At the first farm 4 cows and a buffalo excreted 3 types of *Salmonella*. The importance of isolation of such a variety of *Salmonella* types from calves is discussed from the public health point of view.

KLOTZ, G. (1959). Gehäuftes Kälbersterben im Zusammenhang mit der Verfütterung von Enteneiern. [Fatal salmonellosis in calves associated with feeding of duck eggs.]—*Mh. VetMed.* **14**, 216-217. 3385

Fatal *S. typhi-murium* infection in 23

new-born calves was caused by mixing the contents of duck eggs in their milk. The organism was isolated from 11 ducks on the farm.

—M.G.G.

WOJTEK, H. (1959). Beitrag zum Salmonellen-Abort der Schweine. [? Schafe.] [Salmonella abortion in sheep.] — *Tierärztl. Umsch.* 14, 129-131. 3386

In Bavaria *S. abortus-ovis* infection is found yearly in 40-64% of sheep foetuses sent for examination. The infection is usually introduced and distributed in a flock by an infected ram. Metabolic disorders caused by rich pasture play an important role in the abortions. A procedure for vaccinating pregnant sheep is described.—M.G.G.

LARIONOV, A. P. & KUZ'MIN, N. A. (1959). [Identification of salmonella with the aid of fluorescent antibody.] — *Veterinariya, Moscow* 36, No. 3 pp. 68-73. [In Russian.] 3387

The authors described the preparation by established methods of fluorescein-labelled immune sera against *S. cholerae-suis*, *enteritidis* and *typhi-murium*. The labelled sera were highly specific since fluorescein was taken up only by homologous bacteria. Good diagnostic results were obtained by treating with labelled antibody smears of organs from infected lab. animals.—R.M.

BARTELS, G. (1959). Erfahrungen mit der Abortus-Bang-Ring-Probe im Rahmen des niedersächsischen Brucellose-Anerkennungsverfahrens. [The ring test in the control of brucellosis in Lower Saxony.] — *Rindertuber. u. Brucellose* 8, 41-50. 3388

Positive reactions to the ring test in churn milk from 155 previously negative herds and doubtful reactions in 147 previously negative herds were checked by individual milk and blood tests on each animal. In 143 (92%) of the positive and 77 (52%) of the doubtful herds at least one animal positive for brucellosis was found. In the remaining herds the reactions were attributed to the milk of cows being dried off, udder diseases, colostrum, and residual agglutinins.—M.G.G.

THIENPONT, D., WIKTOR, T. J., MORTELMANS, J., VANDENABBELEE, K. G., BICHE, Y., FAGARD, P. & PINCKERS, F. (1958). Recherches sur la brucellose bovine et humaine au Congo Belge et au Ruanda-Urundi, à propos d'une enquête dans le territoire d'Astrida (R-U). [Brucellosis in cattle and man in the Belgian Congo and Ruanda-Urundi.] — *Ann.*

*Soc. belge Méd. trop.* 38, 1049-1073. [In French. Summaries in English, Flemish, German and Spanish. English summary modified.] 3389

The literature on brucellosis in the Belgian Congo and Ruanda-Urundi is reviewed. The authors investigated bovine brucellosis in Astrida territory and found that the disease occurred in cattle most often in an atypical form as multiple hygromas (5·03%), while by agglutination tests 6·76% of the animals examined were positive. At the same time owners of the herds and their families in the most affected sector were examined. All of the 68 strains isolated were *Br. abortus*.

KOHL, D. & FRITZSCHE, K. (1959). Untersuchungen über Verbesserungsmöglichkeiten bei der Diagnostik der Rinderbrucellose. [Possibilities of improvement in the diagnosis of bovine brucellosis.] — *Rindertuber. u. Brucellose* 8, 17-40. 3390

According to the decree of the West German Minister of Food, Agriculture, and Forestry (17th Feb., 1956) dealing with the results of serological tests for brucellosis in animals, those from infected farms with agglutinin titres between 1 : 20 and 1 : 40 are to be regarded as infected and measures taken accordingly. But in individual animals there can be considerable difficulty in evaluation. Hence the authors studied the value of the Coombs test for incomplete antibodies as an additional aid in diagnosis, comparing the titres reached with those in the agglutination test. In addition the Meinicke, c.f., and opsonic index tests were used in some cases. On several farms, in 2 of which vaccination had been carried out, tests on 3,246 sera showed that animals with a Coombs titre of 1 : 20 or more with a rising tendency could be considered definitely infected, the Coombs was sometimes positive before the agglutination test in infected animals; those with Coombs less than 1 : 20 were probably not infected. Some showed a rising Coombs titre of 1 : 20 or over but no subsequent positive agglutination. In some animals the Meinicke was positive before the Coombs or agglutination. High Coombs titres were found on both farms where vaccination had been carried out, and the high titres were due to vaccination.

The Coombs test is not 100% reliable and there is no unanimity of opinion as to whether it relates to a separate antibody fraction or merely indicates traces of agglutinin. The minimal titres is 1 : 20 and animals showing

this can be regarded as doubtful. The Coombs test (and also the opsonic index) reveals more reactors in an infected farm than are revealed by agglutination.

The principal indications for its use are (a) in farms where after severe infection suitable preventive measures are shortly to be taken, provided the animals have not been vaccinated; (b) in the investigation of animals which following an abortion do not show positive agglutination.—W. K. DUNSCOMBE.

VAN DER SCHAAF, A., JAARTSVELD, F. H. J. & HESSE, N. C. W. (1959). The complement fixation test (C. F. T.) for identification of vaccination titers in the brucellosis eradication campaign. — Proc. XVIth Int. vet. Congr., Madrid 2, 661-663. 3391

12 heifers (aged 8-12 months) from the brucellosis-free island of Terschelling were given s/c inj. of  $60 \times 10^9$  Strain 19. The results of agglutination tests after 1 month showed a reduction in titre but only 6 of the sera became negative after the 6th month when c.f. tests were all negative. 3 months after inj. these heifers and 13 unvaccinated controls were artificially inseminated and at the 5th month of pregnancy were challenged by conjunctival instillation of  $10^7$ - $10^8$  organisms using 3 thionine-resistant strains of *Br. abortus*. All the controls and 7 of 10 vaccinated heifers aborted. Agglutination and c.f. tests were positive on the day of abortion or a few days later and the c.f. test remained positive longer than the agglutination test. Individually the ring test sometimes gave doubtful or negative results. The c.f. test has been standardized and used as a routine and in one area of 254 herds where about 75% of the herds had had calf vaccination with Strain 19 for the last 5 years, out of 5,513 heifers and cows tested only 45.4% were negative. 30.68% gave agglutination titres of 1:20 but the c.f. test was negative in only 0.24% (13 animals). Agglutination titres of 1:50 (doubtful positive) occurred in 18.4%, but c.f. was negative in 17.49% and positive in only 51 animals. Positive agglutination (titre not given) was found in 8.38% but the c.f. test was positive in only 1.75%. Hence in the area (round Utrecht) the true rate of natural infection is about 3%. However the c.f. test may be positive even in cattle with an agglutination titre of only 1:20. It was noteworthy that the type of agglutination in naturally infected and

vaccinated animals differed so considerably that the result of the c.f. test could be predicted.—W. K. DUNSCOMBE.

JACOB, K. (1959). Art und Bedeutung der bei Rinderbrucellose feststellbaren morphologischen Veraenderungen im Euter und in den Euterlymphknoten. [Nature and distribution of lesions in the udder and its lymph nodes in bovine brucellosis.] — Proc. XVIth Int. vet. Congr., Madrid 2, 105-107. [In German.] 3392

The results are given of the examination of 25 udders and their associated lymph nodes from animals serologically positive both in blood and milk; in 23 *Br. abortus* was cultured from the milk or udder, and in the remaining 2 by animal inoculation. Macroscopically no lesions could be detected but histologically the 78 udder quarters showed a granulomatous formation with intralobular proliferative mastitis, and the regional lymph nodes mainly a proliferative reticular reaction. Some of the changes were non-specific and resembled those of indurative mastitis of various origins but in the udder the granulomatous formation was specific and its presence corresponded approximately with the bacteriological findings. There was no resemblance to miliary TB.

—W. K. DUNSCOMBE.

BAUER, F. (1959). Beiträge zur Chemotherapie der Brucellose. [Chemotherapy of brucellosis.] — Berl. Münch. tierärztl. Wschr. 72, 101-104. [Summary in English.] 3393

Of some 350 antibiotics and 2,100 chemical substances tested for anti-brucella action in mice and hamsters, in the last 4 years, streptomycin and "Berenil" (4, 4-diamidino-diazobenzol) proved the most satisfactory. In tests on cows excreting brucella in the milk, Berenil was not satisfactory though streptomycin and tetracycline, especially the former, were effective.

With combined cortisone and streptomycin given over a 27-day period (cortisone either 0.5, or 1 mg./kg. given i/m, and streptomycin 30 mg./kg. i/m) to 4 cows, brucella disappeared from one for more than 2½ years, in two others for more than 1 year, but in the fourth for only 6 weeks, the first three (but not the fourth) showing a progressive reduction in agglutinin titre.

Thus three of four cows seemed to be cured. The cost of treatment is too high for general use, but B. considered it of interest that bovine brucellosis can be cured by this

method although the animals still had (positive) agglutinin titres for months or possibly years afterwards.—W. K. DUNSCOMBE.

PETERS, T. & NEUMANN, H.-J. (1959). Ein weiterer Beitrag zur Vitamin-E-Therapie in banginfizierten Rinderbeständen. [Vitamin E in the treatment of bovine brucellosis.]—*Prakt. Tierarzt* No. 3. pp. 80-82, 84 & 85. 3394

A farm in E. Holstein was investigated which had about 200 milch cows and 200 youngstock, and which had had heavy losses through *Br. abortus* infection for several years although inoculation of the calves with a local vaccine was begun in 1940 and with Strain 19 from 1947. At the end of 1955, 73 animals were serologically positive either in blood, milk, or both, while *Br. abortus* was isolated from several foetuses. Removal of all the reactors was economically impossible, treatment was attempted with vitamin E as "Enoulan forte" reported to contain 30 mg. acetylated vitamin E per ml.

225 animals were treated (100 twice, and 115 three times) with 30 ml. i/m—the first injection in the 4th-8th weeks of pregnancy, the second 8-10 weeks later, and the third after a further 2-3 months. All the animals were given an additional ration containing added vitamins A and D<sub>3</sub>, and the 6 to 9-month-old stock vacinated with Strain 19.

In the 2 following years the disease regressed with reduction in sterility, puerperal disorders and abortions. The results of the vitamin E therapy were considered encouraging. Treatment should be started as soon as possible after conception and 3 injections are advised in severely infected farms.

—W. K. DUNSCOMBE.

HOFFMANN, F., SZAKMÁRY, G. & SZABO, I. (1959). A B-19 brucella-vakcinátorzs tényésztése fermentorban. [Production of large quantities of brucella Strain 19 vaccine.]—*Mag. állator. Lapja* 14, 123-124. [Summaries in English and Russian.] 3395

The propagation of *Br. abortus* Strain 19 was attempted with the use of a slightly modified fermenter apparatus (used in the production of antibiotics), in a fluid medium composed of meat and liver hydrolysate, potato extract and liver dialysate containing 1% glucose. After 23-25 hours' incubation at 37°C. with the total consumption of 3.3 mg./ml. nitrogen a suspension containing 160

thousand million organisms per ml. was obtained.

I/p injections into mice of 1,000 million of the propagated organisms revealed no increase in virulence. The sera of 6 cows taken 4 weeks after each received 50,000 million organisms s/c gave positive agglutination in 1 : 1,200 dilution and positive complement fixation—with one exception—in 0.05 ml. From 2 groups of mice immunized with s/c injections of 1,000 million organisms, 68.5% and 82.7% [no further details] survived a challenge with 10,000 million organisms of virulent *Br. abortus* at the sixth week after immunization.

From these studies the authors conclude that reliable Strain 19 vaccine can be economically produced in this type of apparatus.

—A. SEBESTENY.

GUERRA, M. (1959). Indagine epizoologica su un focolaio di brucellosi ovina. [Investigation of an outbreak of brucellosis in sheep.]—*Arch. Vet. Ital.* 10, 23-27. [Summaries in English, French and German.] 3396

In an investigation of brucellosis in sheep serological tests gave better results than allergic tests. It is considered advisable to employ both the agglutination and the c.f. tests as it may thus be possible to detect infection in different stages.—T.E.G.R.

RENOUX, G. (1958). Etudes sur la brucellose ovine et caprine. XX. Vaccination des brebis contre l'infection à *Brucella melitensis*. Comparaison de trois vaccins. [Studies on ovine and caprine brucellosis. XX. Comparison of three *Br. melitensis* vaccines in ewes.]—*Arch. Inst. Pasteur Tunis* 35, 251-274. 3397

In controlled trials, 88 ewes imported from Sweden and 54 Tunisian Barbary ewes were inoculated with either the live vaccine of Elberg & Faunce [*V.B.* 27, 2325] or the killed vaccine prepared from Strain 53 H. 38 [*V.B.* 28, 1706]. Another 29 Tunisian sheep were inoculated with the killed vaccine prepared from Strain R6 [*V.B.* 28, 3868]. Sheep were challenged 4 months after vaccination with from 1 to 1,200 million organisms. Serological tests were performed and the sheep were killed about a month after challenge for bacteriological examinations. Strain R6 did not give as good results as the other two vaccines. R. preferred Strain 53 H. 38 vaccine to the live vaccine because it was easier to make, store and use.

The minimum infective dose of *Br. meli-*

*tensis* for unvaccinated Swedish sheep was 500,000 organisms and for Tunisian sheep 450,000.—R.M.

RENOUX, G. & KARVOUNARIS, P. A. (1959). Études sur la brucellose ovine et caprine. XXI. Étude comparative des cultures obtenues après infection artificielle par *Brucella melitensis* chez des brebis d'origine suédoise ou tunisienne. [Brucella melitensis from artificially infected Swedish and Tunisian sheep.]—Arch. Inst. Pasteur Tunis 36, 3-27. **3398**

41 sheep imported from Sweden where brucellosis is unknown and 33 Barbary sheep (3-4 years old) free from this infection were inoculated with varying dosages of *Br. melitensis* (Strain 53 H. 38) into the conjunctiva and were slaughtered 1 month later; 5 samples for blood culture were taken between inoculation and slaughter and, P.M., cultures were made from a large number of organs and many lymph nodes, the growth of even a single colony being taken as evidence of infection. Each culture was kept for at least 45 days before being discarded.

Of 354 blood cultures from 74 sheep 57 were contaminated, 16 of the remainder from 13 animals were positive, more in the Swedish than the Barbary sheep; none was positive before the 10th day, or at every sampling.

Out of 994 samples of tissues from Swedish and 800 from Barbary sheep 27 from the Swedish and 22 from the Barbary were positive, while in 1 Barbary sheep blood culture was positive and tissues negative. In Swedish sheep the bile, uterus, and ovary were constantly negative, and in Barbary sheep the lungs, udder, and bladder as well. The lymph nodes were more often positive than any other organ. In general the infection was more extensive and massive in the Swedish sheep, but the distribution of *Brucella* in the tissues can alter depending on whether the infection is natural or artificial, and on the route.

The authors conclude that *Brucella* localize first in the lymph nodes close to the portal of entry; sheep seem capable of eliminating such organisms quickly; the differences between the naturally and artificially infected may be due to the actual duration of infection.

—W. K. DUNSCOMBE.

ORLOV, E. S. & BORISOVICH, Y. F. (1958). [Trials in sheep of live vaccine from *Br. suis* Strain 61.]—Bull. Informatsii Vsesoyuz. Inst.

eksp. Vet. No. 3 pp. 38-39. [In Russian.] **3399**

During 4 years more than 70,000 sheep were inoculated with Strain 61 vaccine, with the result that abortions and stillbirths from *Br. melitensis* infection were greatly reduced. Thus on one farm 5·4% of ewes aborted before vaccination, 0·4% aborted during the first year after vaccination, and none aborted during the second year. The proportion of sheep reacting to complement-fixation and allergic tests for brucellosis was also reduced, e.g. a reduction from 4·3% and 3·8% reacting to each test before vaccination to 0·2% and 0·1% after two years; in the third year none of 3,400 lambs reacted. For complete eradication it was still necessary to isolate ewes and goats which aborted, to destroy aborted foetuses and placentas and to disinfect the site of abortion.

—R.M.

LEHNERT, C. (1959). Über den Einfluss wiederholter Brucella-Allergen-Injektionen auf den Agglutinationstiter bei Schweinen. [Effect of repeated brucella allergen injections on the agglutination titre in pigs.] — Mh. VetMed. 14, 215-216. **3400**

Repeated i/d injection of brucella allergen in 10 pigs did not cause agglutination, c.f., or allergic reactions. The allergic test, being simple and inexpensive, is recommended as a preliminary test to serological investigations for brucellosis in pigs.—M.G.G.

WEBSTER, W. M. (1959). Active immunisation of young calves against *Leptospira pomona*.—Proc. XVIth Int. vet. Congr., Madrid 2, 709-710. **3401**

Inoculation of 3 groups of 7 calves (14, 21 and 28 days old) with a single dose of 10 ml. of heat-killed *L. pomona* vaccine and of 3 similar groups of 5 calves with 5 ml. followed in 7 days by a further 10 ml. resulted in complete protection against a massive challenge with virulent organisms 14 days later in 3 of the singly injected 28-day-old calves and one each of the other two groups and in all the doubly vaccinated 28-day-old calves and one of the 21-day-old group. A febrile reaction but only transient leptospiuria occurred in the majority of the other animals. When 16 doubly vaccinated calves of 14 or 21 days old were placed with calves with a heavy leptospiuria for 10 weeks, only 3 of the 14-day-old calves became infected. None of the completely protected calves had a significant increase in agglutination-lysis antibodies in their blood.—A. ACKROYD.

ALIEV, A. G. (1959). [Pathogenesis of leptospirosis in sheep.]—*Veterinariya, Moscow* 36, No. 4 pp. 41-42. [In Russian.] 3402

Attempts were made to infect 5 lambs by oral administration of cultures of "*Leptospira icteroanemiae* Type 1". A single dose of 200 ml. or 6 repeated doses totalling 150 ml. had no apparent harmful effect on 3 lambs aged 30-45 days. 2 lambs aged 20 days did become ill after repeated doses amounting to 60 or 100 ml.—R.M.

CHOLVIN, N. R., MORSE, E. V. & LANGHAM, R. F. (1959). Experimental *Leptospira pomona* infections in dogs. — *J. infect. Dis.* 104, 92-100. [Authors' summary modified.] 3403

Dogs were susceptible to infection with *L. pomona*. Leptospirosis developed after subcutaneous or oral exposure. Leptospires of both porcine and bovine origin established infection and the renal carrier state. Symptoms were absent. Lesions were limited to the kidney and were observed in all dogs with serum agglutinins. They were minimal in all except one. The pathogenesis was observed by haematological, bacteriological, serological and histopathological techniques. Leptospiraemia followed infection, usually from the third to seventh days.

The serum antibody response was marked in all infected dogs. Reactions for *L. icterohaemorrhagiae AB* and *L. canicola* were constant findings, but the strength of the heterologous reactions never approached those for *L. pomona*. Urinary excretion of leptospires began as early as the 15th day, and persisted for as long as 47 days. Leptospires were detected in the kidneys of one dog 54 days after oral exposure. Since the renal carrier state can be established by oral exposure, the dog may occasionally transmit *L. pomona*. However, its role as a reservoir for *L. pomona* is probably slight.

TOPOLNIK, E. & HAJSIG, M. (1959). Studies on the mucolytic activity of *Vibrio fetus*.—*Antonie v. Leeuwenhoek J. Microbiol.* 25, 108-112. 3404

Using hyaluronic acid and oestral mucus as substrate, the authors studied the production of mucinase by 4 pathogenic strains of *V. fetus* and by one non-pathogenic vibrio.

None of the strains had any effect on hyaluronic acid but all (including the non-pathogenic strain) produced a mucinase active against oestral mucus leading to a marked

decrease in its viscosity. The authors claim that production of mucinase active against oestral mucus could play a part in the pathogenic action of *V. fetus* (but it should be noted that the enzyme was also produced by the non-pathogenic vibrio strain).

—W. J. BRINLEY MORGAN.

HEPPLE, J. R., CHODNIK, K. S. & PRICE, E. K. (1959). Immunisation of lambs against *Clostridium welchii* type D enterotoxaemia (pulpy kidney disease) with a purified toxoid aluminium treated.—*Vet. Rec.* 71, 201-206 & 207. 3405

The preparation from a highly toxicogenic strain of *Cl. welchii* Type D (Saffelin), of a purified trypsinated aluminium treated toxoid is described. Field trials showed it to be potent and safe in ewes and lambs. [See *V.B.* 29, 2378.]—A. ACKROYD.

—YACOWITZ, H., WIND, S., JAMBOR, W. P., WILLETT, N. P. & PAGANO, J. F. (1959). Use of mycostatin for the prevention of moniliasis (crop mycosis) in chicks and turkeys.—*Poult. Sci.* 38, 653-660. [Authors' summary modified.] 3406

Mycostatin in the ration prevented moniliasis in experimentally infected chicks, and markedly reduced the incidence of moniliasis in turkeys. In most experiments the growth rate of test birds was better than in controls: in some cases the difference was statistically significant. No toxic effects were seen in chicks fed mycostatin at high levels.

In chicks and turkeys moniliasis is highly contagious, probably being transmitted by infected droppings. Mycostatin controlled the spread of the disease in chicks and markedly reduced it in turkeys.

After continuous feeding of mycostatin no evidence of resistance to mycostatin was seen in strains of *Candida albicans* isolated from the test chicks.

Experimentally induced moniliasis was a more severe crop infection than that ordinarily seen in commercially reared birds.

✓ BLASCHKE-HELLMESSEN, R. (1959). Ungewöhnliche morphologische Veränderungen bei pathogenen Hautpilzen durch antimykotisch wirkende aerobe Sporenbildner. [Unusual morphological changes in pathogenic dermatophytes produced by aerobic spore-forming bacilli with antimycotic activity.] — *Zbl. Bakt. I. (Orig.)* 175, 282-304. [Summaries in English, French, Spanish and Russian. English summary modified.] 3407

Large spherical bodies were produced on the mycelium of pathogenic dermatophytes by filtrates of cultures of *Bacillus subtilis*. They are considered to be stimulation or inhibition reactions, and were produced even by forty-eightfold dilutions of filtrates of 14 to 18-day old cultures. They were up to 65  $\mu$  in diameter. They were not produced by culture filtrates of bacteria other than *B. subtilis*, high concentrations of electrolytes, high pH, disinfectants or antimycotic drugs. This alteration seems to be characteristic of a group of fungi, as it was observed in pathogenic dermatophytes and in moulds.

DITCHFIELD, J., BUTAS, C. A. & JULIAN, R. J. (1959). Mastitis due to *Nocardia brasiliensis*.—*Canad. J. comp. Med.* **23**, 93-96. [Summary in French.]

3408

During routine processing of milk samples for mastitis surveys, *N. brasiliensis* was isolated from a cow with chronic mastitis involving both hindquarters of the udder. The organism proved refractory to therapy and the animal was slaughtered. P.M. examination revealed a chronic granulomatous inflammatory condition with abscess formation in the hind quarters and the organism was recovered in pure culture from the abscesses.

—R. V. L. WALKER.

CARPENTER, C. M., NAYLOR-FOOTE, A. W. C., TAPLIN, G. V., LAWRENCE, C. A. & DRAKE, C. L. (1959). Preliminary report on vaccines prepared from gamma-irradiated *Mycobacterium tuberculosis* and *Brucella suis*.—*Amer. Rev. Tuberc.* **79**, 374-377. [Authors' summary modified.]

3409

A vaccine has been produced by inactivation of *M. tuberculosis* with gamma-irradiation; it gave protection against challenge infection comparable to that afforded by B.C.G. A vaccine produced in the same way from *Br. suis* was antigenic. Evaluation of the vaccine against TB. is in progress.

GEBAUER, H. (1959). Zur Prophylaxe und Therapie der Puerperalseptikämie beim Schwein. [Prevention and treatment of puerperal septicaemia in sows.] — *Prakt. Tierarzt* No. 6, pp. 201-202.

3410

53 sows were treated prophylactically and 18 with puerperal septicaemia were treated successfully with a preparation containing 20,000 i.u. of penicillin, 20 mg. dihydrostreptomycin and 0.5 mg. prednisone per ml. by the

i/m route. No clinical symptoms developed in sows given 10-15 ml. on the day of parturition.

—M.G.G.

JUSTESSEN, R. (1959). Betaændelsestilstande i halen hos slakterisvin. [Inflammatory conditions of the tail in slaughter pigs.]—*Medlemsbl. danske Dyrlægeforen.* **42**, 313-315. [In Danish.]

3411

A note drawing attention to a condition, with or without abscess formation or necrosis, the incidence of which appears to be increasing. It is apparently caused by reciprocal tail-chewing. From October 1958 to February 1959 among 97,108 pigs slaughtered 100 such cases were recorded: 89 of these were in bacon pigs, 11 in younger pigs of which 20 and 10 respectively were condemned at meat inspection because other organs had become visibly infected (the lungs in 7, the bones in 17, and both lungs and bones in 6). The condition did not appear to be restricted to particular herds.

—F.E.W.

FORBES, M., PARK, J. T. & LEV, M. (1959). Role of the intestinal flora in the growth response of chicks to dietary penicillin.—*Ann. N.Y. Acad. Sci.* **78**, 321-327. [Authors' summary modified.]

3412

Comparison of the growth of germ-free and conventionally reared chicks demonstrates that on adequate diets one or more components of the intestinal flora inhibit growth.

Certain organisms commonly found in the chick's gut (*E. coli*, *Lactobacillus lactis*, and *Str. liquefaciens*), when implanted in chicks free from all other bacteria, do not depress their growth. However, *Cl. welchii* Type A, another component of the intestinal flora, was found to depress the growth rate of otherwise germ-free chicks. Penicillin in the diet largely overcame the growth depression caused by *Cl. welchii*. Thus penicillin, which had no effect on the growth of germ-free chicks or of conventional chicks reared in "clean" quarters, stimulated the growth of chicks with a defined intestinal flora by inhibiting bacteria that retarded growth.

BRAUDE, A. I., SHAPIRO, A. P. & SIEMIENSKI, J. (1959). Hematogenous pyelonephritis in rats. III. Relationship of bacterial species to the pathogenesis of acute pyelonephritis.—*J. Bact.* **77**, 270-280. [Authors' summary modified.]

3413

The pathogenesis of haematogenous pyelonephritis in rats was influenced by the species of infecting bacteria. Strains of

*Proteus* not only established the most severe lesions but also produced renal calculi ( $MgNH_4PO_4$ ). Marked renal destruction also resulted from infection with *Escherichia coli* and *Pseudomonas pyocyanea* and least from enterococci. Yet renal cultures at 4 to 6 weeks yielded a far heavier growth of enterococci than of Gram-negative bacteria; indeed the Gram-negative bacteria had frequently disappeared from the kidneys by then, though the inflammatory reaction they had initiated often persisted.

It is postulated that these differences were related to the following properties of the bacteria studied: (a) the urease of *Proteus*; (b) the endotoxin of the Gram-negative bacteria; (c) the tough cell wall of enterococci.

SMIBERT, R. M., FORBES, M., FABER, J. E., GABUTEN, A. R. & DEVOLT, H. M. (1959). Studies on "air-sac" infection in poultry. I. Infection of germ-free turkeys with *Mycoplasma gallinarum* (avian PPLO) from sinal exudate and broth cultures.—*Poult. Sci.* **38**, 676-684. [Abst. from authors' summary.] **3414**

Sinal exudate (turkey), containing pleuro-pneumonia-like organisms and free from other bacteria, produced inflammation of the air sacs when inoculated intratracheally into 4-week-old germ-free and conventional turkeys, as did also broth cultures of a pathogenic strain of P.P.L.O. inoculated intratracheally. Air-sac infection could not be set up by Seitz (EK) filtrates of either sinal exudate or broth cultures.

No viral contamination was demonstrable either in inocula, lesion tissue, or in the "germ-free" birds.

CASSIDY, D. R. & GRUMBLES, L. C. (1959). Immunity studies on avian infectious synovitis.—*Avian Diseases* **3**, 126-135. [Authors' summary modified.] **3415**

Attempts were made to produce immunity in chickens by actual infection in three studies. In one, slight evidence of immunity was demonstrated.

Formolized yolk or liver and spleen suspensions conferred no practical immunity in four experiments. Passive immunity studies (using sera from convalescent birds) yielded questionable results. In serum neutralization and plate agglutination tests with sera from birds which had survived the disease or been injected with vaccine, significant antibody levels were not detected.

BRINTON, C. C., JR. (1959). Non-flagellar appendages of bacteria.—*Nature, Lond.* **183**, 782-786. **3416**

The results are summarized of investigations on the genetics, biological activity, chemistry and electrophoresis of pili, the filiform appendages observed by electron microscopy growing on the surface of many species of bacteria. Two distinct phases, pilated ( $P+$ ) and non-piliated ( $P-$ ) have been distinguished in *Escherichia coli*. The electrophoretic mobility of  $P+$  is about half that of  $P-$  cells; this is due solely to the pili which can be completely removed from the cells by mechanical agitation in a high-speed mixer. The  $P+$  phase forms smaller and smoother colonies on solid media but colony differences do not necessarily mean a difference in piliation. The  $P+$  to  $P-$  mutation rate is about  $4 \times 10^{-4}$  per bacterium per generation; the reverse mutation is negligible. As the  $P+$  phase has a generation time about 10% greater than  $P-$ , once  $P-$  has arisen, it soon takes over a culture. Mutation and relative growth rates are dependent on the temperature, pure cultures of  $P+$  being obtained by incubation at upwards of  $41^\circ$ . Cell-free culture fluid of shaken  $P+$  cultures containing pili and spheroidal surface material has three biological activities, agglutination of r.b.c., inactivation of certain bacteriophages, and antibiotic activity against another strain of *E. coli* (Colicine E activity), but only the haemagglutination is associated with the pili. Pilation appears to occur independently of flagellation and motility. Pili seem to be stable and are unlikely to be pure protein.—A. ACKROYD.

HOBSON, P. N. & PURDOM, M. R. (1959). A Gram-negative sporing bacterium from the rumen.—*Nature, Lond.* **183**, 904-905. **3417**

Four isolations are reported from diluted rumen contents of sheep and cattle (either by Hungate's anaerobic or an aerobic technique with xylose as carbohydrate) of a Gram-negative rod with subterminal oval spores. Pure cultures were obtained by micro-manipulation or heat treatment. Although under some conditions very similar morphologically to the *Bacteroides* and *Butyrivibrio* spp., the organism was serologically different; biochemically it resembled *Bacillus circulans*.—A. ACKROYD.

PHILLIPSON, A. T., DOBSON, M. J. & BLACKBURN, T. H. (1959). Assimilation of ammonia nitrogen by rumen bacteria.—*Nature, Lond.* **183**, 402-404. **3418**

When rumen liquor from sheep fed on

grass or hay with protein supplements was incubated under CO<sub>2</sub>, the total content of ammonia increased, but in rumen liquor from sheep fed hay with either fodder beet or flaked maize and maize gluten, it decreased. Loss of ammonia nitrogen was accompanied by an increase in the trichloracetic acid precipitate. Organisms which grew well in liquid or on solid medium containing starch, glucose, ammonium chloride providing 87·1% of the

total N, and B vitamins and 1-cysteine which was essential for growth, were isolated most abundantly from rumen liquor of sheep fed hay and flaked maize. The addition of peptone to the medium caused more rapid growth, but ammonia nitrogen was still assimilated. The morphological characteristics of the organisms and the sugars fermented were the same as those described for *Lactobacillus bifidus*.

—A. ACKROYD.

*See also absts. 3597, 3598 (brucellosis).*

### DISEASES CAUSED BY PROTOZOAN PARASITES

UILENBERG, G. (1959). Een geval van Trypanosoma congolense infectie bij een kameel (*Camelus dromedarius*). [*Trypanosoma congoense infection in a camel.*] — *Tijdschr. Diergeneesk.* 84, 610-611. [In Dutch. Summary in English.] **3419**

This case was seen in the Sudan Republic. Trypanosomes disappeared from the blood 48 hours after an i/m inj. of ethidium bromide (1 mg./kg. body wt.)—R.M.

ADLER, S. (1958). The formation of septa during development of trypanosomes.—*Ann. trop. Med. Parasit.* 52, 519. **3420**

On medium containing immune serum, *T. cruzi* produces syncytial masses which may be traversed by fine septa. The formation of fibrils, functioning as septa, as a feature in the life-cycle of a trypanosome was discovered by Shortt & Swaminath (1931) in the case of *T. phlebotomi*; this trypanosome in the mid-gut of the sand-fly forms primary cysts which are traversed by fibrils lying between and separating nucleated masses; the latter eventually form secondary cysts which are also traversed by a mesh of fine fibrils. This has not been reported in the life-cycle of any other trypanosome; in the case of *T. cruzi* the fibrils are formed in syncytia only *in vitro* in specific serum and not during its life-cycle in its hosts. —E.V.L.

NATT, M. P. (1959). The effect of cecal coccidiosis on the blood cells of the domestic fowl. 3. The changes in the leukocyte picture during the course of the infection.—*Exp. Parasit.* 8, 182-187. [Author's summary modified.] **3421**

Lymphopenia and heterophilia were observed on the 5th day of the infection and eosinophilia on the 10th day. No significant changes were observed in the monocytes and

basophiles through the course of the infection. A marked leucocytosis began on the 7th day and persisted through the recovery phase.

ARUNDEL, J. H. (1959). The efficiency and toxicity of pyrimethamine in the control of caecal coccidiosis of chickens.—*Aust. vet. J.* 35, 7-12. [Author's summary modified.] **3422**

Pyrimethamine potentiated the anticoccidial action of sulphaguanidine, sulphapyrazine and sulphadimidine. The optimum concentrations in an all-mash diet were 50 p.p.m. pyrimethamine and 0·05% sulphadimidine.

The toxicity of pyrimethamine at 25, 50 and 100 p.p.m. of an all-mash diet was examined. At each of the three concentrations it caused poor growth and feathering, anaemia, perosis and some deaths. The toxic effects of 50 p.p.m. pyrimethamine could be reversed by the addition of folic acid to the diet, females requiring 0·5 p.p.m., whereas in males this level was insufficient but complete reversal was obtained with 5 p.p.m.

The combination of pyrimethamine and sulphonamide is effective but too toxic for use as a coccidiostat.

SCHWARZ, L., DECKERT, W. & BLOHM, O. (1959). Über die Beeinflussung der Eifarbe durch das wirksame Coccidiose-Vorbeugungsmittel Nicrazin. [Effect of "nicrazin" (nicarbazin) on egg shell colour.]—*Arch. Geflügelk.* 23, 39-46. [Summary in English.] **3423**

Three hens received 0·0125 g. of nicarbazin orally once daily and 3 hens twice daily for 7 days. The egg shells became paler and their ooporphyrin content fell. Weight, fluorescence and translucence of the eggs were not affected consistently.—M.G.G.

LI, P. N. (1958). [Developmental forms of *Babesia ovis* in larvae and nymphs of *Rhipicephalus bursa*.]—*Nauch. Trud. Ukrain.*

*Inst. exp. Vet.* 24, 283-287. [In Russian.]

3424

The occurrence of clavate and oval forms of the parasite in different developmental stages of the tick was described. In nymphs there was a rapid increase in the number of parasites in the sub-chitinous layer, 3-6 days after feeding on rabbits. Although developmental forms of the parasite were sometimes seen in the salivary glands of nymphs, infective forms did not occur.—R.M.

VECHERKIN, S. S., ESIKOV, V. I. & CHIKOV, A. N. (1959). [Intramuscular trypaflavine in haemosporidial infections of cattle.] — *Veterinariya, Moscow* 36, No. 3 pp. 24-26. [In Russian.]

3425

The dose of trypaflavine (acriflavine hydrochloride) by i/m inj. was 5 ml. of a 5% citrated soln. for adult cattle and 3 ml. for youngstock. Reaction to injection (swelling and lameness) occurred in 9 of 526 treated cattle and it lasted for 2-3 days; 10% soln. caused a higher proportion of reactions. A single inj. appeared to have good prophylactic properties in piroplasmosis. [See also *V.B.* 27, 2978.]—R.M.

O'EOLD, J. W., CHRISTENSEN, J. F., LONGHURST, W. M. & ROSENS, M. N. (1959). Latent *Anaplasma marginale* infection in wild

deer demonstrated by calf inoculation.—*Cornell Vet.* 49, 97-115.

3426

In Mendocino in California 10 of 14 calves (13 splenectomized) when inoculated with pooled or individual samples of blood from 41 deer in doses of 10-46 ml. developed anaplasmosis, inoculum from 4 young deer producing negative results. In San Benito 7 of 8 splenectomized calves inoculated with pooled or individual blood samples from 23 deer developed anaplasmosis, two cases proving fatal.

Anaplasma bodies from deer were transferred readily from calf to deer, deer to calf, deer to deer, calf to calf by inoculation. There is no evidence for differentiating the calf and deer strains. The author suggests that *A. marginale* was originally parasitic in wild ruminants and later acquired cattle as hosts. The possibility of other ruminants as hosts must be investigated.—BRENDA M. WILSON.

D'YAKONOV, L. P. (1959). [Role of *Rhipicephalus turanicus* in the epidemiology of anaplasma and theileria infections of sheep.] — *Veterinariya, Moscow* 36, No. 3 pp. 30-32. [In Russian. Summary in English.]

3427

The tick carried *Anaplasma ovis* and *Theileria recondita* in the Stavropol territory.

—R.M.

#### DISEASES CAUSED BY VIRUSES AND RICKETTSIA

GRAHAM, A. M. (1959). Foot-and-mouth disease.—*Vet. Rec.* 71, 383-387.

3428

F. & M. disease was first recorded in England in 1839. In spite of the prohibition on the importation of live animals, it has continued to appear intermittently; this has been due chiefly to the importation of contaminated South American meat and to migrating birds. Under suitable conditions of dryness, cold, and darkness, the virus can remain viable for at least 15 weeks. The incubation period is normally 3-8 days but up to 3 weeks has been recorded. Owing to its extreme infectivity and to the numerous types and variant strains, the slaughter policy with strict infected area restrictions is still the only practical procedure. The symptoms and lesions the disease produces in farm animals, the procedure for dealing with an outbreak, and its importance to the livestock industry and the veterinary profession are discussed.—A. ACKROYD.

DOMANSKI, E. & FITKO, R. (1959). Disturbances of the pituitary and other hormonal

glands in cows after foot-and-mouth disease.—*Proc. XVIth Int. vet. Congr.*, Madrid 2, 421-423.

3429

After the epidemic of F. & M. disease in Poland in 1952, late complications termed "panting" occurred in cows. Symptoms included disturbances of body temperature, lactation and fertility, overgrowth of hair and emaciation or obesity. Abortions also occurred and calves were frequently born dead or weak. Hormonal therapy with luteinizing hormone proved beneficial. Histochemical examination of the endocrine glands showed functional but not inflammatory changes in most of them.

—A. ACKROYD.

FORREST, G. E. & ORTIZ, V. R. (1958). Conservación de antígenos fijadores del complemento en fiebre aftosa. [Conservation of antigen for the complement-fixation test in foot and mouth disease.] — *Rev. Invest. Ganad.* No. 4 pp. 133-135. [Summary in English.]

3430

Bacterial contamination of antigen pre-

pared from bovine tongue epithelium was unavoidable and a search was made for an agent which would suppress contaminating organisms without affecting the c.f. test. Antigen containing 20% chloroform could be kept for 90 days without change. An alternative was a mixture of equal parts of phosphated glycerin at pH 7 and 5% phenol, added to the antigen in a proportion of 1:5.—R.M.

DIMPOULLOS, G. T., FELLOWES, O. N., CALLIS, J. J., POPPENSIEK, G. C., EDWARD, A. G. & GRAVES, J. H. (1959). Thermal inactivation and antigenicity studies of heated tissue suspensions containing foot-and-mouth disease virus.—*Amer. J. vet. Res.* **20**, 510-521.  
3431

The infectivity of bovine tongue epithelium suspensions containing F. & M. disease virus A119 was extremely resistant to destruction by heat, death of all virus occurring only with heat treatment at 85°C. for 6 hours. Intradermolingual inoculation of cattle proved the most sensitive test for detecting the active virus. The interference phenomenon of reversal of infectivity was frequently encountered with virus dilutions especially at the lower temperatures. Preparation by heat of a satisfactory non-infectious antigen of the virus for use in the complement-fixation test could not be achieved.—A. ACKROYD.

SERGEEV, V. A. & YASHENKINA, M. I. (1959). [Propagation of foot and mouth disease virus in monolayer cultures and in suspensions of trypsinized calf kidney cells.]—*Proc. Lenin Acad. agric. Sci.* **24**, No. 4. pp. 16-18. [In Russian.]  
3432

The authors' work largely confirmed that of Bachrach *et al.* [V.B. **26**, 1943] and Cartwright *et al.* [V.B. **27**, 3250]. They considered that a second harvest of virus from monolayer cultures was too poor to be of practical value.—R.M.

CIACCIO, G. & GIROUD, P. (1959). Quelques remarques à propos d'une souche souris-jeune lapin (de 3 à 4 mois) de virus apteux de type C. [Alternate passage in mice and rabbits of mouse-adapted foot and mouth disease virus.]—*Ann. Inst. Pasteur* **96**, 496-499. [English summary modified.]  
3433

A strain of g.pig F. & M. disease virus type C adapted to mice, 25-60 days old, has been maintained during 20 alternate intramuscular transfers into mice and rabbits. The disease is generally not apparent in rabbits

(3-4 months old). In experimentally infected young rabbits (47-54 days old) it follows the same course as in new-born rabbits.

SKINNER, H. H. (1959). The immunogenicity of strains of the virus of foot-and-mouth disease modified by serial passage in white mice and chick embryos.—*Proc. XVIth Int. vet. Congr., Madrid* **2**, 391-393.  
3434

While retaining their infectivity for mice, a considerable degree of attenuation of 4 of the 7 known immunological types of cattle strains of F. & M. disease virus, M 11 (O), VEN 1 (O), 119 (A), and RHO 1 (S.A.T. 2), has been achieved by serial passages in (1) unweaned mice inoculated i/p with suspensions of heart or other tissues, (2) mice over 5 weeks old inoculated i/m, or (3) chick embryos (14 days old) inoculated i/v with heart suspensions. Wide individual variation in susceptibility was observed both *in vivo* and in tissue cultures of adult cattle tongue epithelium monolayers. Of 231 cattle inoculated by various routes with 7 sub-strains of the attenuated types, 20% developed no lesions, 70% local tongue lesions only, and 10% tongue and secondary lesions when challenged in 10 sites in the tongue epithelium with 10,000 I.D.<sub>50</sub> of the homologous virulent strain.—A. ACKROYD.

MATHEKA, H.-D. (1959). Über das Verhalten des Maul- und Klauenseuche-Virus bei Adsorption an Aluminiumhydroxyd und nachfolgender Elution. I. Untersuchung der Faktoren, die die Adsorption und Elution beeinflussen. II. Der Einfluss von Fremdeiweiß auf den Adsorptions- und Elutionsvorgang. III. Reinigung und Konzentrierung von Maul- und Klauenseuche-Virus durch Aluminiumhydroxyd. [Behaviour of foot and mouth disease virus during adsorption to aluminium hydroxide and subsequent elution. I. Factors influencing adsorption and elution. II. Influence of foreign proteins. III. Purification and concentration.] — *Zbl. Bakt. I. (Orig.)* **174**, 473-492; **175**, 40-48. [Summaries in English, French, Spanish and Russian. English summaries modified.]  
3435

I. F. & M. disease virus adsorbed on Al(OH)<sub>3</sub> can be eluted by 0.33 M phosphate buffer (pH 7.5). A method was developed for the quantitative determination of the adsorption and elution of the virus on Al(OH)<sub>3</sub>. The adsorption of culture virus did not follow the classical adsorption equation.

II. The ability of Al(OH)<sub>3</sub> to adsorb F. & M. disease virus was influenced to a high

degree by the concentration of the accompanying foreign proteins.

Experiments with bovine serum protein and virus, singly or combined, revealed that adsorption of protein is not paralleled by adsorption of virus. The adsorption of protein can be expressed as a function of the  $\text{Al(OH)}_3$  concentration. The adsorption of virus seems to follow other rules.

When  $\text{Al(OH)}_3$  has adsorbed protein, adsorption of virus is decreased but not quite inhibited. It is suggested that the virus particles may be eluted by the protein. These results indicate that the coupling of virus to  $\text{Al(OH)}_3$  is not a pure adsorption.

III. Using the method previously described for the adsorption in and elution from  $\text{Al(OH)}_3$ , F. & M. disease virus from tissue cultures could be purified to such an extent that no protein could be detected with the semi-micro method of Kjeldahl. Foreign protein was reduced to less than 25% of the original culture fluid. The infectivity titre was not reduced. Because of the good adsorption of  $\text{Al(OH)}_3$  the virus concentration was increased twenty-fivefold. This concentration may be doubled in the preparation of tissue culture vaccine.

METELEVA, P. I. & RUBANCHIK, I. S. (1959). [Rabies in reindeer in the Arctic.] — *Veterinariya, Moscow* **36**, No. 1 pp. 47-48. [In Russian.] **3436**

An outbreak of rabies occurred in December 1957 in two northern districts, around Salekhard in Western Siberia. In one locality alone 194 reindeer died. Illness lasted for 2-3 days and the commonest manifestation was posterior paralysis. The outbreak was associated with rabies in lemmings and foxes [*V.B.* **28**, 434 & 753]. — R.M.

VILLEMONT, J.-M. & PROVOST, A. (1959). Diagnostic rapide de la rage par le test de précipitation en milieu gélifié. [The gel diffusion test in the rapid diagnosis of rabies.] — *Proc. XVIth Int. vet. Congr., Madrid* **2**, 629-630. [In French.] **3437**

By the gel diffusion test specific precipitation was obtained in all 33 cases of confirmed rabies, as compared with 30 positive histologically, and there was no precipitation in 59 non-rabid brains though amongst these other cell inclusion bodies were found. Trypsinization of the rabid brains lessened chances of failure. The test is very useful in the case of dogs killed at the first appearance of symptoms and

the authors state that the test is more sensitive and is positive earlier than detection of Negri bodies, though this method and perhaps eventually the complement-fixation test, should also be used.

The diagnosis can now be made in 24 hours and the precipitation test will enable more intensive and extensive study of sylvatic rabies.—W. K. DUNSCOMBE.

WALKER, V. C. R. & CRAWLEY, J. F. (1959). The immunizing value of high egg passage Flury rabies virus and its use in combination with the virus of canine distemper.—*Canad. J. comp. Med.* **23**, 50-55. [Summary in French.] **3438**

The effectiveness of the high egg passage Flury rabies virus vaccine for dogs, cats and cattle is discussed after an account of experiments on the duration of immunity. A study of the combination of the rabies vaccine with a distemper vaccine indicated no interference in the antigenicity of either virus when combined. This type of vaccine is recommended to produce maximum immunity with a minimum of effort.—R. V. L. WALKER.

FRENKEL, H. S. (1959). Two methods for the cultivation of vaccinia virus in surviving tissue. — *Proc. XVIth Int. vet. Congr., Madrid* **2**, 443-444. **3439**

F. described tissue culture of vaccinia virus in: (1) pieces of skin from bovine foetuses, using amniotic fluid or modified Baker solution plus penicillin, streptomycin and mycostatin; (2) in the deep layers of adult bovine tongue mucous membrane.

The protective powers of the two tissue culture vaccines in man are being studied.

—W. K. DUNSCOMBE.

BROWN, A., MAYYASI, S. A. & OFFICER, J. E. (1959). The "toxic" activity of vaccinia virus in tissue culture.—*J. infect. Dis.* **104**, 193-202. [Authors' summary modified.] **3440**

The IHD strain of vaccinia virus had a specific toxic effect on secondary monolayer cultures of foetal mouse lung cells, manifested in part as rounding, granulation, and clumping of some cells and destruction or lysis of most cells. Evidence for the cytopathogenic effect was data showing that it is very rapid, is related to high infectious doses, and occurs in the absence of virus reproduction. Both infectivity and toxicity of the virus were inactivated by heat, formalin, immune serum, and ultra-violet light; toxicity, however, was

more resistant to u.v. light than infectivity. The toxic factor was associated with the virus and not with the soluble haemagglutinin.

CASTRUCCI, G. & SCATOZZA, F. (1959). Esperienze di vaccinazione contro il vaiolo ovino mediante l'impiego di un vaccino adsorbito all'idrossido di alluminio. [Experiments with an adsorbed sheep pox vaccine.]—*Arch. Vet. Ital.* **10**, 101-110. [Summaries in English, French, German and Spanish.] **3441**

The vaccine was tested on sheep at two dose levels (1 or 2 ml.). It is deemed harmless as it produced only a local reaction lasting not more than 30 days. At either dose it conferred a solid immunity lasting 3 months. It is considered that further research is necessary before the vaccine can be used in the field.

—T.E.G.R.

GLEDHILL, A. W. (1959). The effect of bacterial endotoxin on resistance of mice to ectromelia.—*Brit. J. exp. Path.* **40**, 195-202. [Author's summary modified.] **3442**

Inoculation of bacterial endotoxin or saccharated iron oxide (Ferrivenin) increases the survival time of newly weaned mice (TO strain) inoculated with  $10^5$  LD<sub>50</sub> ectromelia but decreases the survival time when they are infected with smaller doses of virus ( $10^3$ - $1$  LD<sub>50</sub>). G. suggested an explanation for this.

The mortality of mice inoculated with endotoxin before inoculation with about 1 LD<sub>50</sub> of virus is 95% compared with 55% for normal mice. The time of inoculation of endotoxin in relation to infection time is not critical: mortality is equally increased when endotoxin is inoculated 2 days before or 2 days after infection with 1 LD<sub>50</sub> of virus.

Ectromelia is somewhat more pathogenic for normal weaned mice of one strain (VS) than for another strain (TO), but in VS mice the pathogenicity of the virus is very little increased by inoculation of endotoxin. Consequently, the virus has approximately the same pathogenicity for weanling TO mice treated with endotoxin as for weanling VS mice whether treated with endotoxin or not.

HEATH, R. B. & TYRRELL, D. A. J. (1959). The behaviour of some influenza viruses in tissue cultures of kidney cells of various species.—*Arch. ges. Virusforsch.* **8**, 577-591. [In English.] **3443**

Preliminary experiments having shown cytopathogenic changes in tissue cultures from

a number of animals after inoculation with pneumonitis virus of the new-born (Sendai influenza D), tissue culture was attempted with other influenza viruses. Kidney cell cultures from 8 species of animal including man and also human liver and amnion were used. Kidney cell cultures were found best especially those from chick embryos. In certain cultures 2 distinct multiplication waves occurred, apparently an interference phenomenon. In monkey kidney tissue culture, WS and swine influenza had only mild cytopathogenic effects. The WS, PR 8, and both NWS strains were successfully passaged serially, the other strains not.

The results have shown that well established laboratory strains like WS and swine influenza can multiply in tissue culture from many animals.—W. K. DUNSCOMBE.

WALLACE, G. D. & KISSLING, R. E. (1959). Studies in swine of Asian influenza virus.—*Bull. World Hlth Org.* **20**, 455-463. [Summary in French. English summary modified.] **3444**

In six "normal" pigs (6-8 weeks old) inoculated intranasally with 1·0 ml. of fluid containing approx. 3,200,000 embryo I.D.<sub>50</sub> of Asian influenza virus, clinical evidence of disease was not apparent, but Asian strain virus was isolated from four, and all six developed haemagglutination-inhibiting antibody to A/Asia/Japan/305/57 antigen. Of six other "normal" pigs inoculated intranasally with virus isolated from the first group, the Asian strain virus was isolated from five. Haemagglutination-inhibiting antibody developed in all six, but complement-fixing antibody in none.

The authors conclude that pigs did not play a significant role in the epidemiology of the Asian influenza epidemic in the U.S.A. and that the Asian strain appears not to have established itself in pigs.

LUDWIG, K. A., RUCHMAN, I. & MURRAY, F. J. (1959). MER-27, a suppressant of non-bacterial pneumonia in mice.—*Proc. Soc. exp. Biol., N.Y.* **100**, 495-497. [Authors' summary modified.] **3445**

"MER-27" [9-( $\beta$ -guanylbenzal)-fluorene hydrochloride] suppressed pneumonia in mice induced by influenza virus when given parenterally or orally. It had no effect on viral multiplication. It also suppressed pneumonia induced by *Escherichia coli* endotoxin. It does not enhance viral infection and therefore resembles xerosin in its action.

YAMAGIWA, S., FUJIMOTO, Y., OHSHIMA, K., SATOH, H., SUGANO, S. & USHIJIMA, J. (1959). Gastric erosion in horses affected with Japanese encephalitis.—*Jap. J. vet. Res.* 7, 1-13. [In English. Authors' summary modified.] **3446**

Gastric erosion with ulcer formation was found P.M. in each of 7 horses affected with Japanese encephalitis in an epidemic and in a non-epidemic year. The authors considered thrombosis in the affected tissue to be a causal factor.

SPALATIN, J. & KARSTAD, L. (1959). Experimental infections of wild birds with the viruses of Eastern equine encephalomyelitis, Newcastle disease, and vesicular stomatitis.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 475-476. **3447**

Crows became fatally infected in 3-11 days when Newcastle disease virus was inoculated subcutaneously or intracerebrally, and became sub-clinically infected after oral administration. They showed no apparent infection when exposed to vesicular stomatitis virus. With Eastern equine encephalomyelitis virus, crows, doves, owls and hawks became sub-clinically infected when inoculated subcutaneously, intracerebrally or intracardially, whilst in crows after oral administration, the virus was excreted in the faeces for 4 days.

—A. ACKROYD.

MATTHIAS, D. & UNGER, K. (1959). Die Diagnose der ansteckenden Blutarmut der Pferde mit Hilfe des Innenkörpernachweises im Blut. [Heinz bodies in the diagnosis of equine infectious anaemia.]—*Mh. VetMed.* 14, 75-80. **3448**

Numerous Heinz bodies (50-200 per 1,000 r.b.c.) were seen in the blood of 10 horses with acute equine infectious anaemia and, during and after fever, in 6 with chronic infection, but not in 5 with latent infection. No increase in the number of Heinz bodies was seen in 154 healthy horses and 250 horses with internal, surgical and infectious diseases other than equine infectious anaemia, except in 5 treated with a sulphonamide or a sulphone, which are known to have this effect, and in 3 others in which up to 36 per 1,000 r.b.c. were found. The possibility of equine infectious anaemia could not be excluded in these three. It is concluded that the presence of over 50 Heinz bodies per 1,000 r.b.c. is a reliable indication of this disease and that the presence of over 30 is suspicious. The technique of the test is described.

—M.G.G.

YAOI, H., NAGATA, A., GOTO, N. & SAITO, K. (1959). Experimental studies on equine infectious anaemia (Swamp fever). Report 1. Retransmission of Arakawa's virus to horse.—*Arch. ges. Virusforsch.* 8, 621-631. [In English.] [Also in *Yokohama med. Bull.* 10, 1-10. (In English.)] **3449**

Strain 1 of equine infectious anaemia virus, adapted to the brain of mice by Arakawa *et al.* [V.B. 23, 2825], gave rise to anaemia when inoculated i/v into a horse. Another strain (no. 12) had been passaged 9 times on the chorio-allantoic membrane of chick embryos and twice in the brain of mice; it did not set up typical anaemia when inoculated s/c into a horse.—W. K. DUNSCOMBE.

I. YAOI, H., NAGATA, A., GOTO, N. & SAITO, K. (1959). Etude expérimentale de l'anémie infectieuse des équidés. I. Essai de retransmission à des chevaux du virus d'Arakawa. [Experimental studies of equine infectious anaemia. I. Retransmission of the virus of Arakawa to horses.]—*Bull. Off. int. Epiz.* 51, 76-77. **3450**

II. YAOI, H., GOTO, N., SANO, H. & YAMASAWA, R. (1959). Etude expérimentale de l'anémie infectieuse des équidés. II. Test de neutralisation et de protection à l'aide du virus d'Arakawa. [Experimental studies of equine infectious anaemia. II. Neutralization and protection tests with the virus of Arakawa.]—*Ibid.* 77-78. **3451**

III. YAOI, H., GOTO, N., NAGATA, A. & YAMASAWA, R. (1959). Etude expérimentale de l'anémie infectieuse des équidés. III. Réaction de fixation du complément effectuée avec le virus d'Arakawa. [Experimental studies of equine infectious anaemia. III. Complement-fixation test with the virus of Arakawa.]—*Ibid.* 78-79. **3452**

IV. YAOI, H., GOTO, N., ICHIKAWA, K. & YAMASAWA, R. (1959). Etude expérimentale de l'anémie infectieuse des équidés. IV. Variation du pH du virus Arakawa. [Experimental studies of equine infectious anaemia. IV. Variation in the pH of the virus of Arakawa.]—*Ibid.* 79. **3453**

V. YAOI, H., GOTO, N. & NAGATA, A. (1959). Etude expérimentale de l'anémie infectieuse des équidés. V. Essai d'isolement du virus de l'anémie infectieuse des équidés par inoculation intracérébrale de la souris. [Experimental studies of equine infectious anaemia. V. Isolation of equine infectious anaemia virus by intracerebral inoculation of mice.]—*Ibid.* 80-81. **3454**

I. The re-transmission to a horse of Strain 1, a virus adapted to the brain of mice, has been described in detail elsewhere [see preceding abst].

II. & III. Serum from horses with infectious anaemia reacted positively to serological tests when Strain 1 was used as antigen.

IV. The optimum pH for Strain 1 was 7.5-8; it resisted pH 3 for 6 hours.

V. Attempts to isolate the virus from horse serum by blind passage in mice succeeded only in about a third of cases. The results were not improved by X-irradiation of the mice.—R.M.

OKI, Y., FUJITA, J. & INOUE, T. (1958). [Studies on free ferritin in the blood of anaemia-infected horses. I. Identification of free ferritin in the serum by the complement fixation test.]—*Jap. J. vet. Sci.* 20, 129-137. [In Japanese. Summary in English.] 3455

OKI, Y. & FUJITA, J. (1959). [Studies on free ferritin in the blood of anaemia-infected horses. II. Rise and fall of free ferritin in serum from the jugular vein.]—*Ibid.* 21, 71-84. [In Japanese. Summary in English.] 3456

I. Free ferritin was identified in serum from horses with equine infectious anaemia, but not in serum from normal horses, by a c.f. test employing as antibody rabbit antiserum against horse-spleen ferritin. Antigen was the supernatant fluid obtained by centrifuging horse serum after inactivation by heat. The c.f. titre of infected horses ranged from 1:1 to 1:15 but during attacks of fever it increased to 1:40-1:250.

II. The presence of free ferritin in serum was regarded as evidence of degeneration and collapse of the reticulo-endothelial system of the spleen and to some extent the liver and bone-marrow. The c.f. test for ferritin was negative during the incubation stage of infectious anaemia. The more severe the infection, the higher were the c.f. titres.

—R.M.

BOULANGER, P., BANNISTER, G. L. & RICE, C. E. (1959). Methods of purifying complement fixation antigens for the diagnosis of viral diseases of animals.—*Proc. XVIIth Int. vet. Congr.*, Madrid 2, 481-482. 3457

Detection of rinderpest virus by the c.f. test, using antiserum of a titre of 1:20 or more from rabbits immunized against the Japanese strain of lapinized virus, is possible in acetone-ether extracted spleen of infected cattle but not in crude saline extracts. A crude boiled suspension proved satisfactory for

following the antibody responses in the serum of infected cattle, but in routine surveying of cattle sera, non-specific reactions were frequent. These could be reduced if the period of fixation in the c.f. test was modified to one hour at 37° instead of 18 hours at 9°-12° and antigen was used at a dilution of 1:10.—A. ACKROYD.

ISOGAI, S., ISHII, S., KATAOKA, T. & FUKUSHI, K. (1959). [Studies on the adaptation of bovine strain rinderpest virus in chick embryos. II. Behaviour of multiplication of avianized virus in embryonating hen's eggs.]—*Bull. Nat. Inst. Anim. Hlth, Tokyo* No. 37. pp. 147-158. [In Japanese. English summary modified.] 3458

With the yolk sac method of inoculation, the optimal age for inoculation, period of harvesting virus, distribution of virus in infected eggs, and mortality of embryos did not differ from those observed for lapinized avianized virus by Nakamura and Furutani. The intravenous method was not suitable for titration and passage of bovine avianized virus, the multiplication of virus and production of c.f. antigen being poorer than with the yolk sac method; and here the findings with bovine virus differed from those of the above authors with LA virus. In severely infected embryos, various macroscopic lesions were observed.

VAN BEKKUM, J. G. (1959). A cytopathogenic agent isolated from a cow suffering of a syndrome similar to mucosal disease.—*Proc. XVIIth Int. vet. Congr.*, Madrid 2, 477-478. 3459

A cytopathogenic agent of between 275-400  $\mu$  in diameter has been isolated in cultures of trypsinized bovine foetal skin epithelium from the oral mucosa and pharyngeal glands of a sporadic case in the Netherlands of the mucosal disease complex. It failed to grow in chick embryos or to infect mice or g.pigs, but when inoculated into calves intravenously it caused transient fever, mild leucopenia, occasionally diarrhoea, and superficial mucosal ulcers which persisted or kept developing for several months even though neutralizing antibodies were present in the serum.—A. ACKROYD.

CRANDELL, R. A., CHEATHAM, W. J. & MAURER, F. D. (1959). Infectious bovine rhinotracheitis — the occurrence of intranuclear inclusion bodies in experimentally infected animals.—*Amer. J. vet. Res.* 20, 505-509. [Authors' summary modified.] 3460

Intranuclear inclusion bodies occurred in

epithelial cells of the respiratory tract of 9 calves inoculated with three strains of infectious bovine rhinotracheitis. The inclusions were found between 36 and 60 hours after infection. Fixation with Zenker's or Bouin's fluid was superior to formalin in the demonstration of inclusions.

Their diagnostic value was questionable in view of their transitory nature.

PAPPARELLA, V. (1959). Il virus della leucemia linfatica dei bovini visto al microscopio elettronico. [Electron microscopy of the virus of lymphatic leucosis of cattle.]—*Zootrofoprophylassi* 14, 251-256. [Summaries in English and French.] **3461**

A description of the virus isolated from a calf. There are three photomicrographs.

—T.E.G.R.

MÜNKER, W. (1959). Beobachtungen bei einem subakut bis chronisch verlaufenden Schweinepest-Ausbruch. [An outbreak of subacute to chronic swine fever.]—*Berl. Münch. tierärztl. Wschr.* 72, 152-154. [Summary in English.] **3462**

M. reports an outbreak of swine fever in Upper Hesse affecting 20 pigs on 3 farms which arose from an apparently healthy in-pig sow which farrowed 2 dead and 4 live piglets which however died between 8 and 15 days later. The sow remained healthy and on slaughter some weeks later showed a few petechial haemorrhages of the skin and lungs, redness of the mediastinal lymph nodes, and focal necrosis of the liver. Swine fever was diagnosed in the lab. in 2 piglets though this was not suspected clinically. Pigs from 2 of the farms showed intestinal symptoms but on the 3rd farm the symptoms were predominantly nervous with ataxia, convulsions and paresis. The 3 pigs here were sick for 2 weeks but did not die, and on subsequent slaughter of 1 the findings were suggestive of swine fever. A 10-week-old piglet inoculated with kidney/bone-marrow suspension from pigs from the 2nd farm had a severe but non-fatal illness and 8 weeks later resisted challenge with 1,000 m.l.d. swine fever virus while a control died with characteristic lesions.

M. concludes that possibly because of some peculiarity of the virus, individual animals may show the typical lesions in only one or two organs so that swine fever may not be suspected.

The leucocyte count may help in diagnosis if below 10,000.—W. K. DUNSCOMBE.

SAMÓL, S. (1959). Pomór świń w Polsce w latach 1951-1957. [Swine fever in Poland during 1951-1957.]—*Med. Wet., Warszawa* 15, 140-148. [In Polish. Summaries in English and Russian.] **3463**

The number of outbreaks rose from 1,739 in 1951 to 4,466 in 1955 and fell to 2,230 in 1956, with 2,669 in 1957. The highest incidence was between August and September and was usually preceded by a marked increase in April and May. S. considers that crystal violet vaccination should be carried out in February and March or June and July, i.e., before the seasonal increase in incidence, and that it should be repeated for 3 years in districts where the incidence of swine fever is usually high.—M. GITTER.

KUDRYAVTSEVA, T. P. (1958). [Comparison of lesions caused by Russian, Chinese and American strains of swine fever virus.]—*Bull. Informatsii Vsesoyoz. Inst. eksp. Vet.* No. 3 pp. 26-28. [In Russian.] **3464**

56 young pigs were infected by s/c inoculation or by contact with infected pigs with one of the three strains of swine fever virus "Armagir", "Shi-Moon" and "Washington". While the Chinese strain killed pigs 5-7 (rarely 10) days after infection, the American strain killed in 5-8 but more often 10 days and the Russian strain killed pigs in 10-12 (rarely 14) days. Disseminated non-purulent encephalitis was associated with 70, 100 and 60% of infections respectively. The Chinese strain caused the most widespread lesions.—R.M.

SOEKAWA, M. (1959). Inactivation of hog cholera virus by the use of nitrogen mustard compounds.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 457-458. **3465**

The use of benzyl-bis ( $\beta$ -chloroethylamine) hydrochloride for the inactivation of swine fever virus is reported together with that of a number of related nitrogen mustard compounds.

The results were as follows: (a) the inactivation of the virus is not due to the benzyl group of nitrogen mustards; (b) in one experiment mono- rather than bi-functional mustard compounds were more effective; (c) triethylenemelamine inactivated the virus.

—W. K. DUNSCOMBE.

BOGNÁR, K. (1959). A sertéspestis elleni nyúlvírus-vakcina ártalmatlanságára és hatékony-

ságára vonatkozó tapasztalatok. [Innocuity and efficacy of swine fever vaccine.]—*Mag. állator. Lapja.* 14, 37-40. [In Hungarian. Summaries in English and Russian.] 3466

The innocuity and efficacy of i/m injections of  $\frac{1}{4}$ ,  $\frac{1}{2}$  and 4 times the routine immunizing dose of lapinized swine fever vaccine were studied in susceptible pigs of 32-38 kg. Of 348 pigs, half of which were inoculated with 0.5 ml. and half with 1.0 ml. of the vaccine, 88 reacted with swine fever symptoms and 30 died, and upon challenge with 2 ml. of virulent virus after 2-3 weeks 94 became ill and 20 died. From 172 untreated pigs kept in contact with them 10 showed swine fever symptoms and 2 died, and 40 were immune upon challenge.

Of 146 pigs inoculated with 8.0 ml. of the vaccine 29 reacted and 7 died, and upon challenge with 2 ml. of virulent virus after 2-3 weeks, 37 reacted and 6 died. Of 145 untreated pigs kept with them 15 showed swine fever symptoms and 5 died, while 27 were immune upon challenge. Subinoculations from the spleen of dead pigs did not reveal an increase in the virulence of the vaccine. The variation in the innocuity of the vaccine was found to be dependent upon the difference in susceptibility between groups of pigs and in the virulence between batches of vaccine. Simultaneous use of immune serum and lapinized swine fever vaccine is suggested.—A. SEBESTENY.

BOGNAR, C. (1959). Titration of the virus content of lapinized swine fever vaccine on rabbits. —*Proc. XVIth Int. vet. Congr., Madrid* 2, 459-460. 3467

Freeze-dried vaccine containing spleen material from rabbits infected with the "Rovac" lapinized swine fever virus strain was used in parallel tests on rabbits weighing 1.5-2 kg. and pigs weighing 32-38 kg. from a susceptible stock in dilutions of from 1/4th to 1/1,600th part of the dose prescribed by the vaccine producer, 2 animals of each species being used for each dilution. 2-4 weeks after vaccination the pigs were challenged with virulent swine fever virus. Of 20 pigs that had received from 40-100 rabbit infective doses (RID) of vaccine only 2 became ill, 1 dying, but of 18 pigs vaccinated with not less than 400 RID, 11 became seriously ill and 9 died.

—W. K. DUNSCOMBE.

LIEBENOW, W., FISCHER, K. & RÖHRER, H. (1958). Über Versuche zur Reinigung und elektronenoptischen Darstellung des Virus der Teschener Krankheit (ansteckende

Schweinelähmung). [Purification of Teschen disease virus and examination by electron microscopy.]—*Arch. exp. VetMed.* 12, 627-642. 3468

A considerable number of technical procedures were tested for concentrating and purifying the virus. The authors conclude that Teschen disease virus will withstand chloroform concentration and certain solvents such as dichlorodifluoromethane. It can be precipitated with methanol 15% solution and also with ammonium sulphate and can be subsequently purified by ultracentrifuging.

Examination under the electron microscope of the biologically active purified material revealed spheroidal particles which never occur in the nervous system of healthy animals. These varied from 32.2 to 76.4 m $\mu$  and had a fine granular surface; the interior structure was not determined. In very high magnifications some filamentous structures were seen which resembled those seen in Borna disease.

—W. K. DUNSCOMBE.

DONE, J. T. & HARDING, J. D. J. (1959). Some observations on the comparative neuropathology of Talfan and Teschen diseases.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 117-120. 3469

Comparison of the histological changes in the central nervous system of young pigs inoculated intracerebrally with the viruses of Talfan and Teschen diseases (brain and tissue culture passages) showed that qualitatively they were similar but their severity varied. Lesions caused by tissue culture Talfan virus were much more severe than those caused by brain passage virus and could not be distinguished from those of brain passage Teschen virus. Lesions produced by tissue culture Teschen virus were generally less than those of brain passage Talfan virus. Although less marked than in the grey matter, lesions were found in the white matter. Lesions were also marked in the dorsal root ganglia and bilaterally symmetrical spinal myelin degeneration was demonstrable in both diseases.

—A. ACKROYD.

LANNEK, N. (1959). Enzootisk pneumoni hos svin: etiologi och immunitet. [Enzootic pneumonia in swine: etiology and immunity.]—*Proc. VIIIth Nord. vet. Congr., Helsinki, 1958.* pp. 308-312. [In Swedish. English summary modified.] 3470

Enzootic pneumonia (so-called virus pneu-

monia) in pigs is caused by a micro-organism morphologically similar to the PPLO group and the large viruses. Tetracycline antibiotics can prevent but not cure this pneumonia.

When the pneumonic lesions have healed the animals are immune to the causal agent. Immunity cannot be engendered by repeated intramuscular injections of the agent. An attempt to produce immunity by intranasal inoculation of the agent and administration of protective doses of tetracycline was unsuccessful.

KOŽUŠNÍK, Z. (1959). Studie o devitalizačních faktorech, zvláště o antagonismu vůči viru EBp (chřipky) prasat. [Certain factors in manure, antagonistic to the virus of swine influenza.] — *Sborn. Čes. Akad. zemědělsk. Věd. vet. Med.* 4(32), 115-126. [In Czech. Summaries in English and Russian.] **3471**

Swine influenza virus in pig manure under natural conditions did not survive for more than five days. This was ascribed to the combined effect of ammonia, sulphuretted hydrogen, high temp., fermentation, bacterial enzymes, various decomposition products, and the presence of porcine faecal organisms like *Escherichia coli*, *Staphylococcus albus*, *Bacillus mycoides*, *B. mesentericus* and *Proteus vulgaris*. None of these bacteria on its own, however, nor *Pseudomonas pyocyannea*, had an antagonistic effect on the virus.—E.G.

TICHÝ, V. (1959). K otázce vnímanosti králíka a morče pro virus psinky. [Susceptibility of rabbits and guinea-pigs to distemper.] — *Sborn. Čes. Akad. zemědělsk. Věd. vet. Med.* 4(32), 291-300. [In Czech. Summaries in English and Russian.] **3472**

G.pigs and rabbits were not suitable for the study of the virus because of the irregularity of their reaction.—E.G.

CABASSO, V. J., KISER, K. & STEBBINS, M. R. (1959). Propagation of canine distemper (CD) virus in tissue culture.—*Proc. Soc. exp. Biol., N.Y.* 100, 551-554. [Authors' summary modified.] **3473**

A strain of dog distemper virus, adapted to chick embryos, was propagated for 64 passages in cultures of chick-embryo tissues. Average virus titres of these passages, measured on the chorioallantoic membrane of living chick embryos, ranged between  $10^{3.0}$  and  $10^{4.5}$ /ml. of infected culture suspension. These titres are similar to those obtained with virus grown in living chick embryos. Virus neutralization and

immunization of ferrets established that the agent grown in tissue culture was identical with the original strain. Effective freeze-dried vaccines were produced after different numbers of passages.

SALENSTEDT, C. R. (1959). Studies on the virus of Hepatitis contagiosa canis (HCC). II. Susceptibility of guinea pigs to experimental infection with HCC virus.—*Arch. ges. Virusforsch.* 8, 600-609. [In English. For part I, see *V.B.* 28, 2860.] **3474**

G.pigs inoculated with canine hepatitis virus had a general reaction with lymphocytosis most evident on the 7th day. Out of 10 animals virus was present in the serum at 72 hours after inoculation in six and in some even at 120 hours. In the organs virus was present 6 hours after inoculation; then an eclipse phase occurred until about 24 hours when virus reappeared, reaching a maximum between the 60th and 90th hours. The highest titre was in liver, spleen, lymph nodes and kidney, but after 120 hours was less in the liver than in the other organs. Virus was present in the urine after 36 hours to a less extent than in the organs. None was found in the brain. Antibody formation started on the 6th day, reaching a maximum on the 35th. After inoculation of high dilutions of virus (up to  $10^{-8}$ ) antibodies were formed which persisted up to 6 months.

S. suggests that there is an actual viraemia but that the concentration of virus in the blood is low; the antibodies would indicate true post-inoculation immunity. Thus the g.pig seems to react to the virus in much the same way as the dog and is a suitable experimental animal.

—W. K. DUNSCOMBE.

LEVINE, S., CABASSO, V. J., AVAMPATO, J. M. & STEBBINS, M. R. (1959). Plaque formation by infectious canine hepatitis (ICH) virus.—*Proc. Soc. exp. Biol., N.Y.* 100, 600-602. [Authors' summary modified.] **3475**

Infectious canine hepatitis virus grown in cultures of either dog or pig kidney formed plaques on monolayers of dog kidney. A clone of virus from a plaque was identified as ICH by stationary tube neutralization test as well as by plaque assay. Assay by plaque plates appeared to be a more sensitive method of titration than assay by stationary tissue culture tubes.

ANON. (1959). Feline pneumonitis.—*Mod. vet. Pract.* 40, No. 5, pp. 37-39. **3476**

Feline pneumonitis virus after passage in

the chick embryo gave partial protection against natural infection.

One ml. of commercial vacuum-dried modified live-virus chick embryo vaccine i/m or s/c gave efficient protection against feline pneumonitis for 8–12 months, after which revaccination would be necessary. In field trials it was shown that the vaccine appeared to modify existing infection, the patients recovering in 1–5 days. 13·8% of cats immunized with the vaccine subsequently became ill with feline pneumonitis.—IRENE M. DIXON.

MYKYTOWYCZ, R. (1959). Effect of infection with myxomatosis virus on the endoparasites of rabbits.—*Nature, Lond.* **183**, 555–556. 3477

Wild rabbits naturally infected with *Eimeria* spp., *Graphidium strigosum* and *Trichostrongylus retortaeformis* were caught at about 6 weeks of age, kept under conditions which precluded re-infection, and inoculated at 5 months with an attenuated strain of virus. During the acute stage of the disease there was a reduction in numbers of oocysts and ova which might have been due to changing metabolism in the host or its increased body temperature. This reduction was followed by a significant increase in numbers of ova but not of coccidia. P.M. examination revealed a high count of *G. strigosum*, in some cases over 5,000 per rabbit, higher than in rabbits caught in the field. These worms were newly-hatched adults and fourth-stage larvae.

The expulsion of adult worms during the early stages of infection with the virus and the lowered resistance of the host due to prolonged disease probably create conditions under which dormant larvae may resume development and so aggravate the severity of myxomatosis.

—E.V.L.

CILLI, V. (1958). Aspetti viologici del fibroma di Shope e suoi rapporti con il mixoma di Sanarelli. [Virological aspects of Shope's fibroma and its relationship to the myxoma of Sanarelli.] — *G. Mal. infet. parassit.* **10**, 1017–1040. 3478

Shope's fibroma and the myxoma of Sanarelli are separately dealt with from the aspects of aetiology, experimental pathology, epidemiology, virus variation and immunology. The relationship between these diseases is discussed. Although both are transmitted by an arthropod vector they differ epidemiologically. Shope's fibroma occurs naturally in *Sylvilagus* as a localized, benign, non-contagious disease; myxoma is highly contagious and affects *Oryctolagus* causing high mortality. There is,

on the other hand, a direct immunological relationship. The findings of various workers on the transformation of the fibroma virus into myxoma virus are reviewed. In the concluding chapter the salient points of the treatise—tumour in new-born rabbits and *in vitro* culture of tumour cells—are critically examined. This interesting paper, which should be read in the original by those interested, is illustrated by 32 photomicrographs and carries a bibliography of over 200 references.—T.E.G.R.

BACZYŃSKI, Z. (1959). Studia nad nosicielstwem i siewstwem wirusa rzekomego pomoru drobiu (Newcastle disease). I. Szczury i myszy. [Carriers of Newcastle disease. I. Rats and mice.] — *Med. Wet., Warszawa*. **15**, 148–153. [In Polish. Summaries in English and Russian.] 3479

21 white rats and 17 white mice were starved for 24 hours and fed chick embryos infected with ND virus and intestines of hens which died from this disease. The ND virus could be recovered from faeces of these animals within 24 hours after ingestion of the infected material and subsequently for 5 days from the faeces of rats and 8 days from the faeces of mice. The virus was found in the intestinal wall of 3 rats but not in mice. B. considers that mice act only as mechanical carriers while rats may actually undergo sub-clinical Newcastle disease, but both animals must be considered as potential carriers.

—M. GITTER.

HEJL, J. M. & FABER, J. E. (1959). Detection of bacterial contaminants in live virus poultry vaccines.—*Avian Diseases* **3**, 41–50. [Authors' summary modified.] 3480

The conventional method of testing (agar plate method) did not detect all the bacterial contaminants in virus vaccines containing antibiotics. The membrane filtration method detected bacterial contaminants in such vaccines and its use is recommended. The tests of commercial lots of Newcastle disease vaccine indicated that manufacturers must be more careful in the selection of embryonic material. Such material should be examined bacteriologically before the addition of antibiotics.

CESSI, D. (1959). Ricerche sul virus di Newcastle coltivato in vitro su tessuti embrionali di pollo secondo il metodo di Maytland. I. Studio delle curve di sviluppo del potere infettante emoagglutinante ed immunizzante. [Cultivation of Newcastle disease virus in

**chick embryo tissue culture. I.]**—*Arch. Vet. Ital.* 10, 111-123. [Summaries in English, French and German.] **3481**

In chick embryo tissue culture there was parallel development of infectivity, haemagglutinating and immunizing properties. Antigenicity was lower than that of virus grown in embryonated egg.—T.E.G.R.

**BALUDA, M. A. (1959). Loss of viral receptors in homologous interference by ultraviolet-irradiated Newcastle disease virus.**—*Virology* 7, 315-327. [Author's summary modified.] **3482**

When homologous interference is established in chick cells through the use of ultraviolet-irradiated Newcastle disease virus, the host cells lose their ability to adsorb active virus. After adsorption of about 10 irradiated particles per cell, the initial susceptibility of the cells can be restored by adding specific immune serum within 30 min. after exposure to the interfering agent. The cells were still unable to adsorb virus 49 hours after the addition of irradiated virus. The induction of interference depended on temperature and there was some correlation between the enzymic activity of the virus and its interfering ability. The data suggest that the interfering agent modified the cell surface from an extracellular position.

**CECCARELLI, A. & FARINA, R. (1959). Azione dei tranquillanti sul comportamento della immunità antipseudopestosa in polli vaccinati con virus attenuato. Ricerche con meprobamat.** [Effect of tranquilizers on immunity to Newcastle disease in fowls vaccinated with attenuated virus. Experiments with meprobamate.]—*Zooprofilassi* 14, 239-249. [Summaries in English and French.] **3483**

Meprobamate (800 mg./kg. of food) administered to fowls from the 15th to the 60th day of age had no appreciable effect on the inception and duration of immunity.

—T.E.G.R.

**RAO, S. B. V., SRINIVASAN, V. V. & IYER, S. G. (1958). Studies on duck virus hepatitis.**—*Indian vet. J.* 35, 534-539. **3484**

Virus hepatitis occurred among 200 ducklings imported by air into India. Diagnosis was confirmed by experimental transmission and virus neutralization tests.—R.M.

**CORRÊA, W. M. (1959). Liver histology in virus hepatitis of ducklings.**—*Poult. Sci.* 38, 516-519. [Author's summary modified.] **3485**

The histology of the liver lesions in

infected ducklings (3 days to 4 weeks of age) was: (a) sinusoidal dilatation with hepatic tubules separated and damaged; (b) lymphoplasmocytic infiltration; (c) growth of biliary capillaries followed by (d) growth of connective tissue leading to cirrhosis.

**PAGE, L. A. (1959). Thermal inactivation studies on a turkey ornithosis virus.**—*Avian Diseases* 3, 67-79. **3486**

Psittacosis virus was killed in turkey carcasses roasted in accordance with standard cookery practice.

The virus could still be isolated from turkey carcasses after 372 days at -20°C. Three freezing and thawing cycles over a short period reduced the viable virus content by 99.9%.—IRENE M. DIXON.

**BANNISTER, G. L., BOULANGER, P. & RICE, C. E. (1959). Mastitis produced experimentally in a cow with an agent of the psittacosis-lymphogranuloma group of viruses.**—*Canad. J. comp. Med.* 23, 47-49. [Summary in French.] **3487**

The virus of enzootic abortion of ewes, a member of the psittacosis-lymphogranuloma group, inoculated into the lactiferous sinus of a cow through the teat canal, produced a severe mastitis. The characteristic elementary bodies were observed in films of milk deposits during the first eight days. Chick embryos inoculated with daily milk samples clearly indicated propagation of the virus. Virus reached a relatively high titre on the fourth day and was present in the milk until the tenth day. The results indicate the potential dangers for both animals and man of milk infected with agents of this group.—R. V. L. WALKER.

**FIOCRE, B. (1959). Les broncho-pneumonies à néo-rickettsies des bovins. Contagiosité à l'homme.** [Bronchopneumonia in cattle caused by "neorickettsia" and its transmission to man.]—*Rec. Méd. vét.* 135, 199-210. [Summaries in English and Spanish.] **3488**

F. states that the neo-rickettsia which are on the limits of visibility, are between viruses of the psittacosis group and the true rickettsia. They can cause in addition to lung conditions, encephalomyelitis, abortion, chronic hepatonephritis etc. Sera from bronchopneumonic cases give agglutination with viruses of the psittacosis - lymphogranuloma - trachoma group. The principal symptom is fever and the animal usually dies but the condition may become chronic. P.M. examination shows a

bronchopneumonic or mosaic lung. Treatment is by the tetracyclines and sulphones.

Clinical details are given of cases in 4 cattle one of which died, and of a 5th in a cow which had bronchopneumonia and at the same time the farmer's son had grave infectious jaundice. The cow treated with tetracycline recovered much quicker than the man treated with chloramphenicol, but 10 days after the cow's treatment had finished it developed frank icterus. The serum of both man and cow was positive to Q fever. Lesions similar to those in cattle have also been found in sheep and goats. Transmission is probably by *Ixodes* ticks.

—W. K. DUNSCOMBE.

CARLSTRÖM, G. (1959). Comparative studies on measles and distemper viruses in suckling mice.—*Arch. ges. Virusforsch.* **8**, 527-538. [In English.] **3489**

A study of (1) the propagation of measles virus in unweaned mice; (2) the antigenic relationship between measles and dog distemper virus (CDV) by cross neutralization methods. The measles virus was passaged 5 times in human kidney cells, and the CDV was an avianized strain adapted to unweaned mice. Passage of the measles virus in baby mice was almost 100% lethal after the 7th passage with a tendency to a reduction in the incubation period for the first 15 passages, when it stabilized, death occurring in 5-6 days; the infectivity increased slightly between 8th and 23rd passage. Virus recovered was tested against sera from the convalescent phase.

In animal experiments both immune and control rabbits were tested against measles and CDV. The results showed that the two viruses are antigenically different, but in mice the clinical symptoms of the two infections are indistinguishable and further antigenic studies are required. A tentative suggestion is made of a virus group consisting of measles, CDV, and rinderpest.—W. K. DUNSCOMBE.

MILES, J. A. R. (1959). Latency in viruses.—*Aust. J. Sci.* **21**, 137-145. **3490**

*See also absts. 3597, 3598 (Q fever); 3679 (book).*

## IMMUNITY

ŠTERZL, J. (1959). Presence of antigen—a factor determining the duration of antibody formation by transferred cells.—*Nature, Lond.* **183**, 546-547. **3492**

Spleen cells from immunized ducks or from non-immunized donor mixed with anti-

Susceptibility to antiserum of different phases of bacteriophage is discussed. Prophage, the non-infectious hereditary entity within lysogenic bacteria, appears to be located at a fixed point on a chromosome and may be related to immunity. M. uses the term "latent" as "hidden" prophage at a genetic level until induction or spontaneous maturation occurs. Besides X and u.v. radiation, a variety of chemicals may induce prophage development to bacteriolysis.

Various theories of latency of viruses are discussed: (a) infection *in utero* where animals fail to "recognize" as foreign, substances introduced during foetal life, (b) slow virus production which does not affect host metabolism, the virus surviving for a long time in the blood if no circulating antibody is present; (c) the maintenance of an uneasy balance between virus and antibody until stress factors reduce the efficiency of the antibody mechanism and virus activation results.

Successful experimental infection of HeLa cells by equine and Murray Valley encephalomyelitis viruses is considered to be strictly comparable to the carrier state in phage. M. does not believe that there is good evidence that the animal viruses discussed enter into a state in a host cell comparable with that of prophage in its bacterial host.

—L. N. LOOMIS.

NIŽNÁNSKY, F. & GMITTER, J. (1959). Koxielóza na Slovensku. III. Ohnisko u hovädzieho dobytka. [Q fever in Slovakia. III. In cattle.]—*Vet. Cas.* **8**, 153-160. [In Slovak. Summaries in English, French, German and Russian.] **3491**

During an outbreak of Q fever in a Slovak village in which 28 people became infected, serological examination of the total cattle and sheep population was carried out. Of 2,211 cattle 455, and of 739 sheep 139 yielded positive serological reactions. *R. burnetti* was isolated from cows' milk. [See also *V.B.* **27**, 1791, 2413 & 3017; **28**, 1084.]—E.G.

gen *in vitro*, when transferred intraperitoneally to day-old ducklings produced antibodies for a short period after transfer. At this period of life, ducklings are tolerant of transferred cells and the decline in antibody formation by the transferred cells during the period in which

active antibody response to antigen is not yet developed was shown to be due to the absence of antigen.—A. ACKROYD.

SALVIN, S. B. & SMITH, R. F. (1959). Delayed hypersensitivity in the development of circulating antibody, the effect of X-irradiation.—*J. exp. Med.* **109**, 325-338. [Authors' summary modified.] **3493**

The induction of delayed type hypersensitivity to diphtheria toxoid in the g.pig was not inhibited by total body irradiation up to 300 r in intensity. X-ray doses of 200 to 300 r administered about 18 hours before sensitization extended the period of delayed hypersensitivity to the 19th to 21st day after sensitization in the absence of circulating antibody. X-ray doses of 50 to 100 r decreased the titre of circulating antibody, although delayed hypersensitivity lasted for a normal time. When 300 r irradiation was administered 18 hours after sensitization, delayed hypersensitivity lasted for the usual period and circulating antibody first appeared at the usual 13 to 14 days after sensitization. Introduction of normal serum or leucocytes into irradiated animals did not apparently reduce damage to the mechanism regulating the rate of antibody synthesis.

HRUBEŠOVÁ, M., ASKONAS, B. A. & HUMPHREY, J. H. (1959). Serum antibody and  $\gamma$ -globulin in baby rabbits after transfer of ribonucleoprotein from adult rabbits.—*Nature, Lond.* **183**, 97-99. **3494**

*See also absts.* 3361, 3362 (B.C.G.); 3369 (swine erysipelas); 3372 (haemorrhagic septicaemia); 3337 (typing of salmonella by fluorescent antibody); 3391 & 3395 (brucellosis); 3399 (brucellosis); 3401 (leptospirosis); 3405 (pulpy kidney disease); 3409 (TB. and brucellosis); 3415 (avian infectious synovitis); 3430 (c.f.t. for F. & M. disease); 3438 (rabies); 3441 (sheep pox); 3451 & 3452 (tests for equine infectious anaemia); 3466 & 3467 (swine fever); 3470 (enzootic pneumonia in pigs); 3476 (feline pneumonitis); 3480 (bacterial contamination of virus vaccines); 3525 (Haemonchus contortus).

#### PARASITES IN RELATION TO DISEASE [GENERAL]

YASIN, S. A. & ABDUSSALAM, M. (1958). Récentes contributions à la parasitologie vétérinaire au Pakistan. [Veterinary parasitology in Pakistan.]—*Bull. Off. int. Epiz.* **49bis**, Nos. 11-12 pp. 473-480. [In English. pp. 481-492.] **3496**

An account is given of parasitological research in Pakistan since 1947. A new coccidium, *Eimeria bubalis*, causing severe enteritis and some mortality in buffaloes, was described; oocysts of *E. ellipsoidalis* and *E. auburnensis* were found in buffaloes, *E. (Globidium) cameli*, *E. mölleri* and *E. dromedari* in camels, *Globidium giruthi* was widespread in goats and was demonstrated in a wild sheep, *Ovis nahura*. The incidence, symptomatology and treatment of "gillar", an acute enteritis of cattle caused by young amphistomes, were

Experiments were inconclusive as to whether or not the agglutinins which appear in the blood in 3-5 days are formed *de novo* in 5-day-old rabbits injected with a ribonucleoprotein preparation from the spleens of normal adult rabbits which have received a dose of heat-killed *Salmonella* 2 days previously, but there was no evidence that they were due to passive transfer of antibody. By incorporating amino-acids labelled with radiocarbon into plasma proteins of baby rabbits, it was observed that  $\gamma$ -globulin synthesis was stimulated by the injection of ribonucleoprotein.

—A. ACKROYD.

KENT, L. H. & SLADE, J. H. R. (1959). Immuno-chemically active cross-linked polystyrene.—*Nature, Lond.* **183**, 325-326. **3495**

By nitrating Distrene, an essentially linear polymer of styrene, reducing the product with a large excess of stannous chloride to the poly-amino compound and diazotizing this in acid solution, a soluble polydiazonium styrene was produced which, when coupled with  $\gamma$ -globulin fractions from immune sera in phosphate buffer at pH 8.5, gave a final product containing 60-70% of its weight of protein and showing a high degree of specificity. Cross-linked resins have also been prepared by direct mercuration of polystyrene and by cross-linking the polymer chains via the sulphhydryl group of the antibody protein.—A. ACKROYD.

studied; the disease is widespread in irrigated and swampy areas and causes heavy losses; the intermediate host is *Indoplanorbis exustus*; it is stated that the disease responds to hexachlorethane. *Schistosoma spindalis*, *S. nasalis* and *Ornithobilharzia turkestanicum* were first reported in Pakestan in 1953; it was also reported that *Limnaea auricularia rufescens* was the intermediate host of *O. turkestanicum* and *I. exustus* of *S. indicum*. Work on nematodes, particularly their taxonomy, was carried out by Sarwar, M.M., who also investigated pulmonary strongylosis in sheep—*Protostrongylus indicus*, *Varestrongylus pneumaticus* (intermediate host, *Marochlamys cassida*), *Dictyocaulus filaria* and *Pneumostrongylus ovis*; *Neoascaris vitulorum*, *Strongyloides papillosus* and *Paracoooperia*

*nodulosa* were widespread among young buffaloes. *Parabronema (Squamonema) skrjabini* was found in the abomasum of sheep and goats. *Parabronema africanum* (hitherto found only in African elephant), *Grammoccephalus varensis* and *Bathmostomum sangeri* were found in an elephant. Helminth parasites in the wild boar were *Ascarops strongylina*, *Macracanthorhynchus hirudinaceus*, *Fasciola gigantica* and *Fasciolopsis buski*. *Passalurus ambiguus* was found in lab. rabbits. Inflammation of the hump (due to *Stephanofilaria assamensis* infestation) is under investigation. Arthropods studied were *Menopon gallinae*, *Menacanthus stramineus*, *Lipeurus caponis*, *Cuclotogaster heterographus*, *Goniocotes* sp. and *Goniodes gigas* in poultry. Buffalo pox was transmitted from rabbit to rabbit and from rabbit to buffalo through *Haematopinus tuberculatus*. *Argas persicus*, *Ornithodoros savignyi*, *Sarcopeltis* and *Psoroptes* of sheep were studied. *Allodermanyssus sanguineus*, vector of rickettsia, was reported on mice.

—T.E.G.R.

DRUDGE, J. H., LELAND, S. E., JR., WYANT, Z. N., ELAM, G. W. & HUTZLER, L. B. (1959). Critical tests with polymethylene-piperazine (PMP) against parasites of the horse.—*Amer. J. vet. Res.* **20**, 69-74. 3497

Polymethylene-piperazine administered by

#### PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SKERMAN, K. D. (1959). The efficiency of new insecticides for control of the body louse of sheep (*Damalinia ovis*) by dipping.—*Aust. vet. J.* **35**, 75-79. 3499

Small groups of sheep were dipped individually in a 30-gal. wash. No measures were taken to offset exhaustion: the concentrations are therefore nominal. The following insecticides eradicated lice at the lowest conc. tested: dieldrin and diazinon at 0·0001%, aldrin at 0·001%, BHC and malathion at 0·01%. Neguvon failed at 0·001%, the highest conc. used.

Aldrin and diazinon at 0·001% gave 16 weeks' protection against re-infestation, BHC at 0·01% about 20 weeks, malathion at 0·01% about 18 weeks, and dieldrin at 0·004% about 32 weeks.

Dipping with dieldrin and diazinon at a nominal conc. of 0·005% eradicated lice under field conditions.—N. P. H. GRAHAM.

GILES, E. E. & RAUN, E. S. (1959). Effects of chicken body louse infestation on egg produc-

stomach tube seemed to be twice as effective as when given in the food. Critical tests revealed that 10 mg./kg. body wt. removed nearly 100% mature and immature ascarids, 21 mg./kg. removed at least 85% small strongyles, (sub-critical test value being 10 mg.) 51 mg./kg. removed only 50% *Strongylus vulgaris* (sub-critical value 40 mg.). Removal of *Oxyuris equi* adults ranged from 0-67%, and of the larvae from 0-12%. No action was found against *S. edentatus*, *Trichostrongylus axei*, *Habronema muscae*, *Strongyloides westeri*, *Gasterophilus intestinalis* and *G. nasalis*.

—BRENDA M. WILSON.

CLARK, D. T. & CONNOR, N. D. (1959). Field tests on the efficacy of piperazine-carbon disulfide complex in the treatment of foals for gastrointestinal parasites.—*Amer. J. vet. Res.* **20**, 452-458. 3498

Piperazine-carbon disulphide complex was non-toxic to foals at dosage of 150 mg./kg. body wt. 50 mg./kg. removed 100% of mature and immature *Ascaris equorum*, 75 mg. being needed for removal of 93-97% of small strongyles, large numbers of adult *Oxyuris* worms, and larvae of *Gasterophilus intestinalis* and *G. nasalis*. Carbon disulphide alone had little effect on the number of parasites passed.—BRENDA M. WILSON.

tion.—*J. econ. Ent.* **52**, 358-359. 3500

Egg production in 60 louse-free birds and 60 birds infested with *Menacanthus stramineus* was studied for 14 weeks, following a 4-week pre-test stabilizing period. 10 lice were placed on each of the 5 birds in 12 cages used for infested stock.

Percentage egg production (on a hen-day basis) fell from 52·7 and 66·7% to 42·0 and 6·7% in louse-free and infested birds respectively; differences between the two groups became apparent after 10 weeks. Egg weights were unaffected by infestation. Two of the infested birds had 24,627 and 21,500 lice, dislodged with lindane dust.

—W. N. BEESLEY.

ROTH, A. R. & EDDY, G. W. (1959). Tests with a new organophosphorus compound (Dowco 109) against cattle grubs in Oregon.—*J. econ. Ent.* **52**, 169-170. 3501

Dowco 109 (=O-(4-tert-butyl-2-chlorophenyl) O-methyl phosphoramido-thioate) was tested orally and as a spray

against *Hypoderma lineatum* and *H. bovis* in weaners and yearlings. Treatment was given in October-December and the cattle were examined monthly in the following February-April. Oral dosing at 4-15 mg./kg. gave 67-100% control and 20-25 mg./kg. 94-100% control. Spraying with 0·75% Dowco 109 gave 71-100% (2 quarts per head) and 99-100% control (4 quarts); Dowco 109 is probably equally effective in spray form as Bayer 21/199 (Co-ral) and orally as Dow ET-57 (Trolene).

—W. N. BEESLEY.

DRUMMOND, R. O. (1959). Texas field tests for the control of cattle grubs with sprays of Bayer 21/199. — *J. econ. Ent.* **52**, 512-513. [Author's summary modified.] **3502**

Single or multiple treatments with sprays of Bayer 21/199 (*O*-(3-chloro-4-methylumbelliferone) *O*, *O*-diethyl phosphorothioate) were used in field tests in Texas, for the systemic control of warbles in cattle. At Kerrville five treatments with 0·75% spray completely prevented encystment of larvae. A single treatment with 0·5% spray prevented all except one larva from reaching the backs of treated animals. However, one treatment with 0·25% spray afforded only 53% control. In groups of cattle sprayed once with 0·5% Bayer 21/199 there was 90 to 96% control of larvae. Reasons for failure of 0·25% spray are discussed.

PRYOR, W. J. & SKERMAN, K. D. (1959). Prevention of breech strike in Merino ewes by plunge dipping in dieldrin and diazinon. — *Aust. vet. J.* **35**, 13-15. **3503**

Two field trials used groups of 400 to 600 adult Merino ewes. The sheep carried wool about 1 in. long at the time of dipping in December. In the first trial a diazinon emulsion at a nominal concentration of 0·02% was compared with an arsenic-cresol-derris emulsion at a wash concentration of 0·13%. 1·2% of the diazinon dipped group were struck from the fifth week onwards. In the second trial one group was dipped in a diazinon emulsion and the others in a dieldrin emulsion at nominal concentrations of 0·01% and 0·025% respectively. The strike rate was similar in both groups, viz. 3·4% and 3·8% respectively, and occurred between the 12th and 17th week.

The concentrations of both the diazinon emulsions dropped to one fifth and the dieldrin suspension to two thirds of their nominal values. All strikes occurred on the breech area.—N. P. H. GRAHAM.

GOULDING, R. L. & TERRIERE, L. C. (1959). Malathion residues in the milk of dairy cows treated for horn fly control. — *J. econ. Ent.* **52**, 341. **3504**

Milk sampled up to 60 hours after treatment with 4% or 10% malathion dust (2 oz. per cow), or power spraying with 0·5% wettable powder suspension (1 gal. per cow), was examined for insecticide residue. Contamination was slight (0·01 p.p.m.) 36 hours after the use of 4% dust and moderate (0·03 p.p.m.) 12-60 hours after using 10% dust. 4 hours after treatment with 0·5% spray, 0·5 p.p.m. malathion was detected in the milk. All three formulations effectively controlled horn flies (*Siphona (Lyperosia) irritans*) on the cattle for 4-5 days but re-treatment was necessary in 9-14 days.—W. N. BEESLEY.

WARE, G. W. & GILMORE, L. O. (1959). Lindane in milk from sprayed cows. — *J. econ. Ent.* **52**, 349-350. **3505**

Two cows were sprayed with 1·5 gal. of a suspension containing 1 lb. of 25% lindane wettable powder in 100 gal. of water. A second pair were similarly treated but with Tide detergent added at the rate of 2 lb. per 100 gal. A spray pressure of 40 lb. per sq. inch was used.

Milk samples were taken up to 17 days after treatment. Maximum concentrations of lindane in whole milk and in butter-fat occurred within one day: 0·4 p.p.m. falling to about 0·025 p.p.m. (17 days) in whole milk, and about 4-11 p.p.m. (17 days) in butter-fat. The detergent did not affect the appearance or disappearance of lindane in the milk.—W. N. BEESLEY.

BURNS, E. C., TOWER, B. A., BONNER, F. L. & AUSTIN, H. C. (1959). Feeding Polybor 3 for fly control under caged layers. — *J. econ. Ent.* **52**, 446-448. [Authors' summary modified.] **3506**

Polybor 3 (containing 98% of disodium octaborate tetrahydrate ( $\text{Na}_2\text{B}_8\text{O}_{13} \cdot 4\text{H}_2\text{O}$ )) was added to the food of caged laying hens for 5 months at 0·05, 0·1, 0·2, 0·3, and 0·5%. House-fly larvae were controlled by the higher rates of dosage, but boron residues were found in both eggs and tissues at all levels of dosage.

DEM'YANCHENKO, G. F. (1959). [Simuliidae as ectoparasites of farm animals.] — *Veterinariya, Moscow* **36**, No. 4 pp. 72-75. [In Russian.] **3507**

Six species were identified in the Beloruss S.S.R. and the most important for feeding on farm animals was *Schonbaueria pusilla*. In the

early morning and evening in May and June sometimes as many as 10,000 flies were counted on a horse or an ox, particularly when the temp. was between 13° and 20°C. Intradermal inj. of an emulsion of the thorax of 500–1,000 flies caused a large painful swelling within 3 hours accompanied by fever and depression in cattle, horses and sheep. Intravenous inj. of an extract of the thorax of 5,000 flies caused acute toxic symptoms followed by diarrhoea and dyspnoea in oxen. Control measures proposed were: spraying cattle with creolin emulsion of DDT and BHC; keeping them indoors between 6–9 a.m. and 7–9 p.m.; aerial application of insecticide to pastures at times when the flies were most numerous.—R.M.

ANGELOVSKI, T. (1959). Prilog poznavanju tick paralysis-a kod ovaca u nr Makedoniji. [Tick paralysis in sheep in Macedonia.] — *Vet. Glasn.* 13, 31-37. [In Croat. Summary in French.]

3508

In Macedonia, there are yearly outbreaks of tick paralysis in sheep, caused by *Ornithodoros lahorensis*, *Haemaphysalis chodlakovskiy*, *H. punctata*, *H. inermis*, *Hyalomma savignyi*, *Dermacentor silvarum*, *Ixodes ricinus*, and *Rhipicephalus bursa*. Control by parasiticides, particularly gammexane, was satisfactory.

—E.G.

BREMNER, K. C. (1959). Observations on the biology of *Haemaphysalis bispinosa* Neumann (Acarina: Ixodidae) with particular reference to its mode of reproduction by parthenogenesis.—*Aust. J. Zool.* 7, 7-12. [Author's summary modified.]

3509

*H. bispinosa* reproduces by obligatory parthenogenesis. Male ticks were scarce in both experimental and natural infestations, occurring in the ratio of one to about 400 females. Dissections of five males showed that these produced no spermatozoa, irrespective of whether they had fed or not. Rates of development of the non-parasitic stages under controlled conditions are recorded.

HAZELTINE, W. (1959). Chemical resistance of the brown dog tick.—*J. econ. Ent.* 52, 332-333.

3510

SVADZHIAN, P. K. (1959). [Migratory route of the metacercariae of *Dicrocoelium lanceatum*.] — *Veterinariya, Moscow* 36, No. 4 pp. 45-48. [In Russian. Summary in English.]

3514

Engorged female *Rhipicephalus sanguineus* ticks were placed in cloth bags, 5-10 per bag, and dipped for 10 sec. in insecticide emulsions (0·05% lindane, 0·5% chlordane). Many tick populations were resistant to lindane, and chlordane was not very effective at the concentration used. H. concludes that there is a fair degree of resistance to the two insecticides at Dallas, Texas.—W. N. BEESLEY.

KRAEMER, P. & FURMAN, D. P. (1959). Systemic activity of Sevin in control of *Ornithomyssus sylviarum* (C. & F.).—*J. econ. Ent.* 52, 170-171.

3511

Sevin (N-methyl-1-naphthyl carbamate) was added to laying mash as a 50% wettable powder to give final concentrations of 1,500 or 3,000 p.p.m., and fed for 1-5 days. Birds ingested up to 1,225 mg. of Sevin/kg. body wt. over 5 days without apparent ill effect; one bird died after taking 270 mg./kg. over a 48-hour period. Heavy infestations with *O. sylviarum* (= *Liponyssus sylviarum*) fell to nil within 2 days and the birds remained mite-free for 7-21 days. Birds readily accepted feed containing up to 3,000 p.p.m. Sevin, although egg production fell temporarily by 10% (not necessarily as a result of the acaricide).

—W. N. BEESLEY.

I. SAVOV, N. (1959). [Death of a heifer caused by massive infestation with juvenile forms of *Linguatula serrata*.] — *Vet. Sbir.* 56, No. 1, pp. 22-24. [In Bulgarian.]

3512

II. DANAILOV, I. (1959). [Lethal infestation of goats with juvenile forms of *Linguatula serrata*.] — *Ibid.* pp. 24-25. [In Bulgarian.]

3513

I. Massive infestation with larvae of the tongue-worm was found in the mesenteric lymph nodes in 195 of 1,153 slaughtered cattle. The death of a heifer from haemorrhagic enteritis was attributed to large numbers of larvae, found in the wall of the intestine.

II. Haemorrhagic enteritis associated with numerous tongue-worm larvae occurred in two flocks of goats. Two goats recovered after stibophen therapy, and 3 of 4 goats recovered after s/c inj. of "Neguvon" at 0·04 g./kg. body wt.—R.M.

#### PARASITES IN RELATION TO DISEASE [HELMINTHS]

A lamb was fed three daily doses each of 2,000 ants (*Formica rufibarbis*) about 7% of which were infested with metacercariae of the trematode. The lamb was killed on the fourth day. Two rabbits and 4 g.pigs were also

infected. It was concluded that metacercariae reach the bile ducts of the liver by way of the duodenum and the common bile duct as early as 2 hours after ingestion. S. could not accept the view that metacercariae reached the liver by the portal veins.—R.M.

DORSMAN, W. (1959). A new treatment of cattle against liver flukes (*Fasciola hepatica*). — *Proc. XVIth Int. vet. Congr., Madrid* 2, 609-610. 3515

Cattle with *F. hepatica* infestation were dosed with 2,2'-methylenebis(3,4,6-trichlorophenol), known as hexachlorophene or compound G-11. A single dose of 40 mg./kg. body wt. completely freed 3 animals from the parasite; one animal died 6 days after treatment, the other 2 showed only slight signs of intoxication. A dose of 15 mg./kg. killed all or nearly all adult flukes, but not young flukes that had not yet reached the bile ducts. A dose of 10 mg./kg. caused a pronounced and lasting reduction of the egg count. The drug was at least as effective orally as by s/c injection. Compound G-11S [2,2'-thiobis(3,4,6-trichlorophenol)] was nearly as active against *F. hepatica* as G-11, but 2,4,5-trichlorophenol, dichlorophen, G-5 and bithionol appeared to be inactive.—M.G.G.

LIENERT, E. (1959). Experimentelle Arbeiten auf dem Gebiet der Chemotherapie der Distomatose. [Chemotherapy of fascioliasis.] — *Proc. XVIth Int. vet. Congr., Madrid* 2, 597-599. [In German.] 3516

Sexually mature *Fasciola hepatica* implanted in the abdominal cavity of rats were used for testing drugs against fascioliasis. Hexachloroethane, hexachlorophene, male fern extract and pentachloroethane killed the flukes, but tetrachloroethane and dichlorophen were ineffective. In untreated rats 49% of *F. hepatica* were alive 6 days after implantation. —M.G.G.

KOVACS, F. (1959). Die intramuskulaere Behandlung der Rinderfasziolose mit Tetrachlorkohlenstoff. [Intramuscular treatment of fascioliasis in cattle with carbon tetrachloride.] — *Proc. XVIth Int. vet. Congr., Madrid* 2, 605-607. [In German.] 3517

Cattle with *Fasciola hepatica* infestation were inoculated i/m in the side of the neck with a mixture of equal volumes of carbon tetrachloride and liquid paraffin plus 0.5 g.% lignocaine base. The dose of 8 ml./100 kg. body wt. (maximum dose 40 ml.) was divided and given in 2 or 3 places. Slaughter 2-4 days

after treatment revealed that over 90% of adult flukes were killed. About 150,000 cattle have been treated in this manner, with losses of only 0.02-0.03%. A small amount of carbon tetrachloride, not more than 3 mg. per litre, was found in the milk of treated cows.

—M.G.G.

TÖLGYESI, G. (1959). Csigairtás klórozott fenolokkal. [Eradication of snails with chlorinated hydrocarbons.] — *Mag. állator. Lapja* 14, 87-88. [In Hungarian. Summaries in English and Russian.] 3518

The lethal effect on snails of pure pentachlorphenol and chlorinated carbolic oil (a phenol and cresol rich fraction from tar distillation) was studied. From groups of 340 snails consisting of *Radix peregra*, *Galba truncatula*, *Succinea oblongata* and *S. hungarica* 332 died in 1 : 1,000,000 solution of pentachlorphenol, 308 died in 1 : 1,000,000 solution of chlorinated carbolic oil, 7 died in well water and 5 died in the water from which the snails were collected, within 24 hours.

1 kg. chlorinated carbolic oil was sprayed in 10% soln. over two areas of wet pasture, each 1,000 sq. metres. When snails were collected 4 weeks later, 7 out of 121 snails were found to be alive on one of the treated areas and 14 out of 76 snails were found to be alive on the other. In the untreated neighbouring areas about half of the snails were found to be alive.

These results suggest that chlorinated carbolic oil has the same efficiency against snails as copper sulphate. It is considerably cheaper and could be used instead of copper sulphate.—A. SEBESTENY.

SKJENNEBERG, S. (1959). Ekinokokkose hos rein i Kautokeino. [Echinococcus infestation of reindeer in northern Norway.] — *Nord. VetMed.* 11, 110-123. [In Norwegian. Summaries in English and German.] 3519

Echinococcus cysts were found in 9.6% of 2,204 slaughtered reindeer; they occurred only in the lungs. Transmission and control of infestation were discussed.—R.M.

RICO, C. M. & VITA, L. A. (1959). Experiencias hidáticas en aves carnívoras y omnívoras. [Attempted infection of carnivorous and omnivorous birds with Echinococcus.] — *Proc. XVIth Int. vet. Congr., Madrid* 2, 717-721. [In Spanish.] 3520

200 birds of 22 species were fed for 40 days meat containing hydatid cysts and for drinking water were given fluid from such

cysts. Examination of faeces and intestinal contents revealed neither eggs nor proglottides of *E. granulosus*. It is concluded that birds do not disseminate this parasite, because of (1) their high body temp., (2) the acidity of their faeces.—M.G.G.

LUKS, J. (1959). Częstość występowania bąblowców wątroby u świń. [Incidence of hydatid cysts in the liver of pigs in Poland.] — Med. Wet., Warszawa 15, 98-95. [In Polish.] 3521

L. found that 4,900 out of 10,969 slaughtered pigs (44·68%) had tapeworm cysts in the liver and live parasites were found in 2,265 of the cysts. In a second survey 1,355 carcasses were examined and 670 liver cysts found (*E. granulosus* in 200, *C. tenuicollis* in 226, both parasites in 53).—M. GITTER.

HEYNEMAN, D. & WELSH, J. F. (1959). Action of homologous antiserum *in vitro* against life cycle stages of *Hymenolepis nana*, the dwarf mouse tapeworm.—Exp. Parasit. 8, 119-128. [Authors' summary modified.] 3522

Using an *in vitro* technique, each phase of the life cycle of *H. nana* was tested against immune serum developed in rabbits against the adult worm antigens. Specific actions were as follows. Against the egg: precipitation inside the outer shell membrane, withdrawal of the central membrane from the embryophore, agglutination of intact eggs, and a reduction of infectivity in mice to about 1/20 the control level. Against the cysticercoids: cuticular bubbling on the tail, eversion of rostellum, immobilization of suckers, and reduction of infectivity to about  $\frac{1}{4}$  that of controls incubated in normal serum, and about  $\frac{1}{8}$  that of those maintained in saline and 5% glucose. Against adults: increased motility, increased contracture causing rupture and spilling of eggs into the incubation medium (where they agglutinated); and, finally, a precipitation layer appearing first at the scolex and then completely enveloping at least some of the worms, and apparent on most of the others.

Mode of action of the immune serum is briefly discussed and compared to the pattern characteristic of certain nematodes in which similar precipitation phenomena have been described.

TURNER, J. H. (1959). Experimental strongyloidiasis in sheep and goats. I. Single infections.—Amer. J. vet. Res. 20, 102-110. 3523

Eight lambs and two kids between two and

three months old were infected with *Strongyloides papillosus*, being given single doses, percutaneously, of from 25,000 to 1,000,000 infective larvae. Eggs first appeared in the faeces 9 days after infection, reached a peak after 15-18 days and fell to a low level after 7-8 weeks. Symptoms were dyspnoea, slight to moderate anaemia, diarrhoea, polyuria and loss of weight. Animals receiving more than 100,000 larvae died in from 13 to 41 days.

—J. F. MICHEL.

NICOLSON, T. B. & GORDON, J. G. (1959). An outbreak of helminthiasis associated with *Hyostrongylus rubidus*. — Vet. Rec. 71, 133. 3524

The authors reported an outbreak of parasitic gastritis associated with the nematode *H. rubidus*, in breeding sows.

Of the 30 sows and 3 boars, 15 sows and 1 boar were in poor condition with marked inappetence. None died and the animals, though emaciated, were active. The faeces were dark coloured, dry and hard.

The animals had access to a potato silage pit, and to a catch crop of turnips for a period, and were fed with 4-16 lb. of poor quality meal daily. After transferring the sows to a farrowing house six weeks before farrowing, one 3-year-old sow was killed. She was emaciated and anaemic, having stomach lesions; the gastric mucosa being covered with a yellowish diphtheritic membrane, beneath which large numbers of the parasites were visible. The underlying mucosa was thickened but not inflamed. A zone of gelatinous oedema was visible beneath the mucosa. No parasites were present in the intestine. 1,200 eggs per g. of faeces were recorded compared with 300 per g. in the other animals.

The outbreak was controlled by anthelmintic treatment with phenothiazine and piperazine.—BRENDA M. WILSON.

JARRETT, W. F. H., JENNINGS, F. W., MCINTYRE, W. I. M., MULLIGAN, W. & SHARP, N. C. C. (1959). Studies on immunity to *Haemonchus contortus* infection—vaccination of sheep using a single dose of X-irradiated larvae.—Amer. J. vet. Res. 20, 527-531. [Authors' summary modified.] 3525

Batches of infective larvae of *H. contortus* were treated with between 10,000 and 100,000 roentgens. The larvae were then given orally to sheep to assess the degree of inactivation achieved by irradiation and the immunity pro-

duced by such treated larvae. It was found that larvae subjected to 40,000 and 60,000 r produced a good immunity to re-infection.

MAYHEW, R. L., TORBERT, B. J. & MILLER, G. C. (1959). Studies on bovine gastrointestinal parasites. XX. The results of feeding small amounts of phenothiazine in pure infections of *Cooperia punctata*.—*Amer. J. vet. Res.* **20**, 492-497. [Authors' summary modified. For previous parts, see *V.B.* **21**, 2944, **22**, 1784 & **23**, 3110.] **3526**

In 56 experiments on 14 cattle daily feeding of small amounts of phenothiazine (0·5-1g.) had no effect on egg production of *Cooperia punctata*, but reduced the number of infective larvae to a very low level.

The reduction of egg counts in some individuals was believed to result from immune reactions rather than the drug, because there was no consistent relationship to the amounts being fed or to the time of the experiment. These animals also proved to be resistant to re-infection.

ZAJÍČEK, D. (1959). Příspěvek k výskytu a patogenezi žaludeční červivosti u kachen. [Stomach worms in ducks.] — *Sborn. Čes. Akad. zemědělsk. Věd. vet. Med.* **4(32)**, 133-140. [In Czech. Summaries in German and Russian.] **3527**

24% of an unstated number of ducks, examined at the Prague Veterinary Institute, were infested with *Echinuria uncinata*, 2% with *Tetrameres fissipina*. *E. uncinata* produced chronic necrotic proventriculitis, *T. fissipina* epithelial changes with secondary, proliferative inflammation, generally not visible macroscopically.—E.G.

BOLDÝREVA, N. V. (1958). [Differences in distribution of radiophosphorus in healthy ducks and chicks infested with *syngamus*.] — In "Raboty po gel'mintologii" pp. 86-88. [Moscow: Izd. Akad. Nauk. SSSR] [In Russian.] **3528**

The comparative radioactivity of blood, trachea, lungs, small intestine, liver, spleen and kidney at 1, 9, 18 and 48 hours after s/c inj. of radiophosphorus is shown in a table. The chicks were 2-2½ months old. Some had been infected at 20 days of age with eggs of *Syngamus skrjabinomorpha*. Radioactivity of the adult parasites collected from the host 9 hours after inj. of P was 50 counts/min. (in 100 mg. of fresh tissue); after 18 hours it was 64 counts and after 48 hours it was 81 counts.

Incorporation and elimination of the isotope differed greatly in infected and non-infected birds.—R.M.

DZHANIASHVILI, M. G. (1959). [Tin arsenite as an anthelmintic.] — *Veterinariya, Moscow* **36**, No. 1 pp. 68-70. [In Russian.] **3529**

D. studied the physico-chemical properties of the anthelmintic and concluded that its active principle was a complex salt of sodium stannate and tin arsenite, not the arsenate as previously stated [*V.B.* **28**, 1481]. Tin arsenate was readily soluble in water, but tin arsenite was poorly soluble; the two salts could be distinguished by the ability of arsenate to decolorize N/10 iodine soln.—R.M.

LANGELER, J. E. T. (1959). Moderne longwormtherapie. [Aerosol therapy of parasitic bronchitis.] — *Tijdschr. Diergeneesk.* **84**, 650-656. [In Dutch. Summaries in English, French and German. English summary modified.] **3530**

Tests of the aerosol inhalation therapy for lungworm infestation described by Enigk [*V.B.* **28**, 2207] suggested that a single treatment is highly effective in uncomplicated parasitic bronchitis, and is superior to treatment with cyanacethydrazide.

A calculation of the expense of the aerosol treatment showed that the anthelmintics used (ascaridol and santonin) contribute much more to the costs than the price of the apparatus. To reduce the cost of treatment search must be made for less expensive drugs which are at least as active against lungworms as ascaridol with santonin.

PARKER, W. H., ROBERTS, H. E., VALLEY, T. F. & BROWN, F. T. (1959). Field trials of diethylcarbamazine against lungworms in cattle. — *Vet. Rec.* **71**, 509-511. [Authors' summary modified.] **3531**

In the 3 field trials reported the main criteria of therapeutic efficacy were weight progress, faecal larval output, and clinical appearance. Significant weight-gain responses were obtained in two outbreaks—in one, accompanied by marked clinical improvement and depression of faecal larvae. In the third outbreak (more chronic and seriously complicated by "virus pneumonia") depression of faecal larvae was the only effect.

The results support previous laboratory experiments [*V.B.* **28**, 489; **29**, 781] on diethylcarbamazine for treatment of parasitic bronchitis.

WHITLOCK, J. H. (1959). *Elaphostrongylus, the proper designation of Neurofilaria*.—*Cornell Vet.* **49**, 3-27. 3532

W. gave his reasons for tentatively assigning to the genus *Elaphostrongylus* three new specimens of a nematode recovered from the cranial subdura of a blind deer and from the brain of a paralysed ram, and gave a formal description of the specimens as *Elaphostrongylus tenuis* (Dougherty, 1945) nov. comb. He considered them identical with those he described in 1952 as *Neurofilaria cornellensis* [V.B. **22**, 2880] which name now joins the list of synonyms.

—BRENDA M. WILSON.

WINTER, H. (1959). *The pathology of canine dirofilariasis*.—*Amer. J. vet. Res.* **20**, 366-371. 3533

10% of dogs examined P.M. in Queensland were infected with *Dirofilaria immitis*. The prominent lesions observed were haemosiderosis, chronic inflammation, thrombosis, fibrosis and moderate emphysema in the lungs; erythrophagia and haemosiderosis in lymph nodes; haemosiderosis in spleen, passive venous congestion and in advanced cases lymphatic congestion in the liver; also ascites and anasarca.

There was no evidence of toxins being produced by the parasites.

—BRENDA M. WILSON.

HEISCH, R. B., NELSON, G. S. & FURLONG, M. (1959). *Studies in filariasis in East Africa. Filariasis on the Island of Pate, Kenya*.—*Trans. R. Soc. trop. Med. Hyg.* **53**, 41-53. 3534

The incidence of filariasis in man on the island was 32% in males and 28·4% in females, the microfilarial density in blood films being nearly 3 times as high in males as in females, though the females live in closer contact with the vector.

The following species of filarial worms were found in animals: *Dirofilaria corynodes* in cercopithecus monkeys; *Wuchereria patei*

and *D. repens* in dogs, cats and genets (*Genetta tigrina*); *D. immitis* and a *Dipetalonema* in dogs; a *Setaria* sp. in donkeys and cows. The distribution, breeding, and feeding habits of three of the commonest mosquito vectors, *Aedes pembaensis*, *Culex pipiens fatigans* and *A. aegypti* were studied. The proportion infected with third-stage filarial larvae was respectively 3-4%, 25% and 2%. In feeding experiments, only *W. bancrofti* and *D. immitis* developed well in *C.p. fatigans*. *W. patei*, *D. repens*, *D. immitis*, *D. corynodes* and the donkey *Setaria* developed well in *A. pembaensis*. *D. corynodes* and the *Setaria* developed in *A. aegypti*. The filarial species in mosquitoes infected in nature were identified by studying the morphology of the caudal end and the life history of the larvae collected from the 15,000 mosquitoes dissected, and it was concluded that *C.p. fatigans* is the only vector of *W. bancrofti* in the area. *A. gambiae* is a vector on the East African mainland, and since small numbers of this species were collected, it is possible that it may increase in favourable conditions, and act as a seasonal vector.

—BRENDA M. WILSON.

NEWTON, W. L., WEINSTEIN, P. P. & JONES, M. F. (1959). *A comparison of the development of some rat and mouse helminths in germfree and conventional guinea pigs*.—*Ann. N.Y. Acad. Sci.* **78**, 290-306. Discussion: p. 307. [Authors' summary modified.] 3535

The rat nematode *Nippostrongylus muris*, the mouse nematode *Nematospiroides dubius*, and the mouse tapeworm *Hymenolepis nana* were found to develop to apparently normal fertile adults in germ-free g.pigs (animals generally considered to be abnormal hosts for these parasites). While worm yields in the case of *N. muris* were very low, in the case of *N. dubius* they were as high as 23% of the larvae inoculated. Development of these helminths in conventional g.pigs was either extremely poor or failed to occur. The significance of these findings is discussed.

## SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

ROBERTS, S. R. (1959). *Myxoma of the heart in a dog*.—*J. Amer. vet. med. Ass.* **134**, 185-188. [Author's summary modified.] 3536

An account of a case in which an intracardial tumour in a 14-year-old dog caused signs of congestive heart failure. The tumour,

a myxoma in the right atrium, metastasized to the radicles of the pulmonary artery.

ROONEY, J. R. (1959). *Liver carcinoma in the dog*.—*Acta path. microbiol. scand.* **45**, 321-330. [In English. Author's summary modi-

fied.]

3537

R. reported 16 cases in dogs; 5 were of the hepatocell type and 11 were of the cholangiocell type. Hepatic carcinoma of the dog is a disease of older age-groups with no specific breed or sex disposition. Pathologically, hepatic carcinoma in man and the dog is stated to be similar, except that in the dog (1) liver carcinoma is not associated with cirrhosis; (2) primary carcinoma of the liver is more frequent than metastatic; (3) cholangiocell carcinoma is more common than hepatocell carcinoma.

RIVÉ, M., LEVADITI, J.-C. & VARENNE, H. (1959). Neuf cas de cancer chez le lapin Angora. [Nine cases of cancer in Angora rabbits.]—*Rec. Méd. vét.* 135, 31-43. [Summaries in English and Spanish.] 3538

In the departmental veterinary laboratory of Maine-et-Loire, 449 rabbits (of which about 90% would be Angoras) were examined P.M. in the period 1950-54, no case of cancer being found. In succeeding years, there were, in 1955, 1 case in 129 rabbits, in 1956, 1 case in 159, and in 1957, 6 cases in 226 rabbits. Nine cases are now described, all in Angora females, aged from 1½ to 4 or 5 years (average longevity of Angora rabbits being 4-5 years). The tumours were in seven animals carcinomas, in two, sarcomas (mesothelium, thyroid region). In seven, tumours were present in the lungs, being of primary pulmonary origin in one or perhaps two animals.

The possible role of diet, vaccination against myxomatosis, and disinfection, in the causation of the tumours is discussed, and not thought to be significant.—E. COTCHIN.

STOENESCU, V., DRĂGHICI, D., NICOLICIN, S., BOBOS, C. & SĂNDULESCU, S. (1958). O hepată însoțită de neoplazii, cu caracter enzootic la răță. [Endemic hepatitis with neoplasia in ducks.]—*Probl. Epiz., București* No. 8 pp. 179-195. [In Roumanian. Summary in French.] 3539

The condition was endemic in a flock of 200-300 Peking and Khaki-Campbell ducks causing during 6 years an annual mortality of from 17 to 37% of all stock. Cirrhosis and adenoma of the liver were common P.M. findings. In addition, 4 ducks had sarcomata of the peritoneum and pleura. The cause of the disease was unknown.—R.M.

MOHYUDDEEN, S. (1959). A study of eye cancer among bovines in Mysore State with special reference to its histopathological features, biological behaviour and some factors asso-

ciated with its causation.—*Indian vet. J.* 36, 125-132. 3540

"Eye cancer" is fairly common in cattle in Mysore State (and very rare in buffaloes). There is no special seasonal incidence nor regional distribution, but the tumour is more common in working bullocks fed in stalls on concentrates, straw, &c., than in cows grazing on green grass. The condition more often affects older animals, and usually develops very slowly. The usual site of origin is the third eyelid. Surgical intervention is successful if carried out at an early stage, but aggravates advanced cases. It is thought that possibly irritation by extra-ocular *Thelazia* may be one of the factors associated with the development of the tumour, and that vitamin A deficiency may be a predisposing factor.

During some 5 years, 60 bovine "eye cancers" were sectioned: 57 were typical squamous-cell carcinomas, and 3 were adenomas. From 17 conjunctival carcinomas, fresh material was transplanted into the guinea-pig eye: two eyes became infected, and 8 of the remaining 15 tumours grew in the anterior chamber.—E. COTCHIN.

JUBB, K. V. & MCENTEE, K. (1959). The relationship of ultimobranchial remnants and derivatives to tumors of the thyroid gland in cattle.—*Cornell Vet.* 49, 41-69. 3541

Evidence is presented that the ultimobranchial bodies contribute apparently typical thyroid follicles to the substance of the mature gland of cattle. This is based on observations of direct transformation in foetal, neonatal, and hyperplastic thyroids, the metaplastic reversal of the process in vitamin A deficiency and hyperoestrogenism, and the neoplastic reversion of the process coincident with the concurrent development of neoplasia in ultimobranchial residues and in the perihilar and peritrabecular thyroid lobules but not in the more peripherally situated lobules.

—A. ACKROYD.

HATAYA, M., USUI, K. & SHIRASU, Y. (1959). Studies on the treatment of transmissible venereal tumor in the dog by X-ray and  $\gamma$ -ray irradiation.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 287-288. 3542

In Japan, transmissible venereal tumour is a common disease in dogs. When the tumour is too extensive for surgery, X-ray irradiation in doses of 200-400 r at intervals of 2-3 days until a total dosage of 800-2,400 r has been given, has resulted in complete eradication even

in advanced cases. Application of Co<sup>60</sup> needles of 16–32 millicuries in the vaginal cavity for 1–2 days has also been effective.

—A. ACKROYD.

DALTON, P. J. (1959). Ionising radiations in malignant neoplasia.—*Proc. XVIth Int. vet. Congr., Madrid* 2, 73–74. 3543

In tissues, X- and beta-rays which are the most commonly employed ionizing radiations in veterinary radio-therapy cause (1) simple chemical changes subsequent on ionization, the ejection of one or more electron from an atom leaving it chemically unstable; (2) ionization of water in cells to produce free hydrogen and hydroxyl radicles which combine with dissolved oxygen to produce hydrogen peroxide; and (3) unexplained cell injury leading to malignant changes. The radio-sensitivity of cells is in direct proportion to their reproductive activity and inversely proportional to the degree of differentiation. Whilst surgical removal of neoplasia remains the treatment of choice in veterinary practice, radio-therapy alone or with surgery is most commonly employed in the region of the lips, mouth, extremities and perineum.—A. ACKROYD.

KUWATA, T. (1959). Studies on the infection of tumor cells by extraneous viruses. II. Susceptibility of two transplantable mouse tumors to neurotropic viruses.—*Arch. ges. Virusforsch.* 8, 610–620. [In English.] 3544

Col SK, Western (WEE) and Eastern (EEE) equine encephalomyelitis and Japanese encephalitis viruses, when inoculated into 8-day-old grafted quinone-induced carcinoma and fructose-induced sarcoma in mice, multiplied and the Col SK and Japanese encephalitis viruses invaded the central nervous system especially in young mice. When tumours were soaked in viral suspensions before being transplanted, Col SK virus markedly retarded their growth, but WEE, EEE, and Japanese

encephalitis viruses did not. Rabies fixed virus did not propagate in either tumour.

—A. ACKROYD.

DMOCHOWSKI, L., GREY, C. E., BURMEISTER, B. R. & GROSS, M. A. (1959). Submicroscopic morphology of avian neoplasms. III. Studies on visceral lymphomatosis.—*Proc. Soc. exp. Biol., N.Y.* 100, 514–516. [Authors' summary modified.] 3545

Ultra-thin sections of tumorous spleen from chickens with natural and experimental visceral lymphomatosis were examined in the electron microscope. Spherical and spheroid particles were observed within inclusion-like bodies in the cytoplasm of cells, in cytoplasmic vacuoles, and in intercellular spaces. The particles had an internal dense zone of about 300 Å, surrounded by a less dense zone, and were limited by an outer membrane of a diameter varying from 640 Å to 820 Å, average 720 Å. They resembled in appearance, but not in size, particles observed in erythroblastosis and granuloblastosis of fowls.

SMITH, W. M., JR. & LONG, G. H. (1959). Effect of environment versus breeding on farm flock incidence of visceral lymphomatosis.—*J. Amer. vet. med. Ass.* 134, 373–376. [Authors' summary modified.] 3546

The incidence of visceral lymphomatosis varied with the breeding of the birds. However, even so-called "resistant" varieties were not completely refractory to the disease. There were wide farm-to-farm differences in incidence, even among birds of identical breeding and parent sources which had been hatched together, the incidence being far more characteristic of the farm environment than of the bird involved.

One of the factors affecting the incidence of visceral lymphomatosis was hatch date, with a higher incidence in birds hatched in January–March than in April–June.

## NUTRITIONAL AND METABOLIC DISORDERS

DOLCI, G. (1957). L'emoglobinuria parossistica da sovraccarico idrico del vitello. [Haemoglobinuria due to excessive water intake in calves.]—*Gazz. Vet., Milano* No. 4, pp. 18–20. 3547

Paroxysmal haemoglobinuria affects calves aged 3–10 months, is caused by excessive water intake and lasts 1–3 days followed by gradual recovery; in unfavourable cases there is progressive worsening of the general symptoms, muscular tremors and death from

pulmonary oedema or from collapse. Differential diagnosis, prevention and treatment are discussed.—T.E.G.R.

JOHNSON, C. E., HARBERS, L. H. & PRESCOTT, J. M. (1959). Effect of alkaline drinking water on the pH and microbial activity of the rumen.—*J. Anim. Sci.* 18, 599–606. [Authors' summary modified.] 3548

In cattle which drank highly alkaline water for 16 weeks, the pH of rumen contents

was no higher than that of controls which drank water of much lower pH and total alkalinity. Inocula from animals receiving alkaline water gave *in vitro* cellulose digestion values not significantly different from those of animals receiving control water, and which were comparable with values from numerous other *in vitro* experiments.

ARMSTRONG, D. G., BLAXTER, K. L., GRAHAM, N. McC. & WAINMAN, F. W. (1959). The effect of environmental conditions on food utilisation by sheep.—*Anim. Prod.* 1, No. 1. pp. 1-12. **3549**

A series of calorimetric experiments was conducted with sheep which had fleeces ranging in thickness from 0·1 cm. to 12 cm. at environmental temperatures between 8° and 32°C. The metabolizable energy of the ration increased by 6 cal./°C. with increasing environmental temperature. The critical temp., (*i.e.*, the environmental temp. at which heat production was minimal) for the closely shorn sheep varied from 24°C. at a high level of feeding to 38°C. at a low level. The critical temperature fell as the fleece grew and was 0°C. when the fleece was 12 cm. long. At environmental temperatures below the critical temp., heat losses per unit area of body surface were identical irrespective of level of feeding and at temperatures above 32°C. heat production increased with the higher levels of feeding. For two winters groups of Cheviot and Black-face sheep were wintered indoors in a thermostatically controlled building or outside exposed to the weather. Weight gains were slightly better in the indoor group, especially in the Cheviots.—E. J. CASTLE.

LAGERVALL, M. (1958). The effects of plane of nutrition on growth, reproduction, and life span in mammals as shown in mice.—*K. LandtbrHögsk. Ann.* 24, 1-47. [In English.] **3550**

High-plane nutrition (H) meant *ad libitum* consumption and low-plane (L) 75% of this. Low-high (LH) and high-low (HL) groups were switched, at 42 days old. Both HH and LH females gave an increased lifetime production of young over HL and LL females; but life span was longest in the last two groups. LH females produced significantly more litters and more young (means of 55 and 63) than HH. The worst overall breeding performance was by the HL females and the shortest life span occurred in the HH group. As it was found impracticable to measure mouse milk production, lifetime pro-

duction of young was considered an acceptable substitute criterion. Bone development and true adult body weight were greatest in HH females.—F. L. M. DAWSON.

WILLIAMS, D. R. & EVANS, R. A. (1959). Bracken (*Pteridium aquilinum*). The effect of steaming on the nutritive value of bracken hay.—*Brit. J. Nutr.* 13, 129-136. [Authors' summary modified.] **3551**

Two sheep in metabolism cages were fed *ad libitum* for 9 days on unsteamed or steamed bracken hay.

Unsteamed bracken hay, made in July, had a nutritive value similar to that of good meadow hay. The sheep selected the less fibrous material of higher protein content.

Steaming to inactivate the toxic factor(s) resulted in a drop in nutritive value due to lowered digestibility of organic matter, especially of the crude-protein fraction. The steamed bracken hay was still superior to poor meadow hay or straw.

The bracken hay, unsteamed or steamed, formed the sole diet of sheep for 72 days without ill effect, and was consumed at a rate adequate for weight maintenance.

Net retention of nitrogen occurred in all trials.

TAYLOR, R. J. F., WORDEN, A. N. & WATERHOUSE, C. E. (1959). The diet of sledge dogs.—*Brit. J. Nutr.* 13, 1-16. **3552**

The results of a study conducted in the Antarctic and in England, showed that pemmican, which has been used for feeding sledge dogs over the last 26 years, was unsatisfactory when fed alone [see *V.B.* 29, 796]. A new diet containing fish meal, milk powder, dried yeast, maize starch, margarine and beef suet has been devised and is being tested with encouraging results.—E. J. CASTLE.

PHILLIPS, B. P., WOLFE, P. A. & GORDON, H. A. (1959). Studies on rearing the guinea pig germfree.—*Ann. N.Y. Acad. Sci.* 78, 183-207. [Authors' summary modified.] **3553**

As a result of studies over 5½ years in which numerous liquid, dry, and semi-solid diets were devised and evaluated for their efficacy in sustaining life and promoting growth in germ-free g.pigs, it was possible to obtain germ-free g.pigs of good quality and to maintain them in good health to adult life. Survival time was increased from a few days in the early trials to more than a year in recent ones. Some information was obtained concerning vitamin requirements. Certain

anatomical and haematological characteristics of germ-free g.pigs are discussed. Limited attempts to rear germ-free g.pigs into the second generation were unsuccessful. However, the animal is easily obtained germ-free by caesarian section and, because of its comparatively advanced state of development at birth, requires no hand-feeding or other complicated feeding procedures during infancy. The first-generation germ-free g.pig may therefore be considered a more practical tool for use in biological investigation than; e.g. first-generation rats and mice.

LUCKEY, T. D. (1959). Nutrition and biochemistry of germfree chicks. — *Ann. N.Y. Acad. Sci.* **78**, 127-165. [Author's summary modified.]

3554

The biochemical implications of germ-free research, initiated by Pasteur in the last century, have come into experimental fruition only in the past decade. The vitamin and protein losses incurred during sterilization of the diets are made up by adding excess quantities of the labile nutrients. Diet may be sterilized by steam under pressure in the liquid or dry states. Chicks fed a liquid diet become immobilized by the glue-like material. Supplements for diets may be sterilized by filtration. Gamma-ray sterilization is very useful, and ethylene oxide (as carboxide) has been used to sterilize diets for chicks. Germ-free chicks have also been used as feed for germ-free rats.

Monobiotic (germ-free) chicks grow satisfactorily when fed either practical or synthetic diets that are complete after sterilization. The chemical composition (vitamin and gross analysis) of the chicks is generally similar to that of conventional chicks. The differences observed indicate that liver and bile are less stable biochemically than other tissues examined. Folic acid and particularly biotin are the most stable vitamins in tissues of chicks subjected to dietary stresses of vitamin deficiencies.

Germ-free chicks required the following vitamins: A, D, E, K, thiamin, riboflavin, niacin, biotin, and folic acid. Studies with other B vitamins were inconclusive. The interrelationship of vitamins was studied by analysing tissues of chicks in different deficiency states.

Comparisons were made between monobiotic chicks and chicks in different dibiotic ( harbouring a single species of microorganism) systems.

HENDERSON, G. L. B. & KEYWOOD, E. K. (1959). An osteodystrophy in Siamese kittens.—*Vet. Rec.* **71**, 317-318. [Authors' summary modified.]

3555

The condition is discussed and the symptoms described. The principal lesions are in the bone structure and the thyroid gland. Two main aetiological factors appeared to be involved, namely the pre-natal and early post-natal diet, and secondly, the thyroid adenopathy. The exact aetiology remains obscure but a comparison is drawn between this condition and a similar one produced in kittens maintained on an experimental diet.

WILGRAM, G. F. & TAYLOR, W. J. R. (1959). Experimental cirrhosis of the liver in primates.—*Lancet* January 3rd, 26-27.

3556

Cirrhosis of the liver of the Laënnec type was induced in two *Cebus* monkeys by feeding a diet low in choline and protein but rich in cholesterol, for 17 months. A normal diet was fed for two brief periods during this time. Liver biopsy findings are described. Both animals recovered rapidly when fed a normal diet.—E. J. CASTLE.

SIMPSON, C. F., PRITCHARD, W. R. & HARMS, R. H. (1959). An endotheliosis in chickens and turkeys caused by an unidentified dietary factor.—*J. Amer. vet. med. Ass.* **134**, 410-416. [Authors' summary modified.]

3557

The clinical findings and the lesions in a disease of chickens and turkeys, characterized primarily by ascites and hydropericardium, are described.

This disease was reproduced experimentally in chickens by feeding diets containing 5 and 10% "toxic-fat".

Haematological examinations revealed a reduction of erythrocytes by 20-30% and of thrombocytes by 40-60%, an increased proportion of heterophiles and a decreased proportion of lymphocytes.

The primary microscopic lesion in this disease appears to be proliferation and hypertrophy of vascular endothelium. In addition, the toxic agent may have a necrotizing effect on hepatic and bile duct tissue.

POUNDEN, W. D., PRATT, A. D., FRANK, N. A., CONRAD, H. R., HAHN, A., FETTER, A. & DAVIS, R. R. (1959). Pasture bloat. Stable foam and gas production capacities of pasture plants in vitro.—*Vet. Med.* **54**, 159-162.

3558

Bloat occurred 157 times in 32 dairy cattle grazing a legume-grass pasture over two years. The rumen flora of the bloated cows differed

little from the normal except that on average there were more long chains of streptococci. The numbers of organisms fell within normal limits, however.

*In vitro* tests showed that the capacity of plants to produce foam when mixed with water in a Waring blender was lowest in cocksfoot and increased in other plants in the following order: brome grass, bird's-foot trefoil, Ladino clover and lucerne. Stable foam could be produced with lucerne and Ladino clover in this way but not with bird's-foot trefoil, cocksfoot or brome grass. When incubated with rumen contents Ladino clover produced more gas than lucerne which in turn produced more than bird's-foot trefoil and cocksfoot. Lucerne and Ladino clover thus have the highest potentialities for the rapid formation of a stable foam.—E. J. CASTLE.

MANGAN, J. L. (1959). **Bloat in cattle. Aspects of research work at Plant Chemistry Division, D.S.I.R., Palmerston North, New Zealand.** —*Proc. R. Soc. Med.* **52**, 376-379. 3559

Studies included the use of antifoaming substances for the treatment of frothy bloat, and the identity of the foaming agents in the rumen ingesta. The main foaming agents are plant saponins, leaf cytoplasmic protein, mucoprotein secreted in the saliva, and, possibly, extracellular bacterial polysaccharide. Leaf cytoplasmic protein appears to be the most important, but the salivary protein may make a contribution. Attention was paid to the properties of saliva secreted by the various glands.

—E. J. CASTLE.

BOOKER, D. V. (1959). **Caesium-137 in dried milk.** —*Nature, Lond.* **183**, 921-924. [Author's summary modified.] 3560

Measurements of the caesium-137/potassium ratio in dried milk and some corresponding results for hay have been obtained for 1957 and the first half of 1958. In dried milk from Driffield (relatively low rainfall) the ratio in summer 1957 (25-30  $\mu\text{uc}$ . of Cs<sup>137</sup> per g. of potassium) dropped to 10-15  $\mu\text{uc}$ . per g. in the winter. In dried milk from Carmarthen (high rainfall) ratios were 60-70  $\mu\text{uc}$ . per g. in summer and about 40  $\mu\text{uc}$ . per g. in winter. The winter decrease in the ratio may be due to the supplementary feeding of cows. A large increase in the ratios in dried milk from all areas was observed in June 1958 and is associated with a larger than usual rate of fall-out in May 1958 and subsequent months. The average Cs<sup>137</sup>/K ratio in dried milk in  $\mu\text{uc}$ . per g. for the period April 1957-April 1958 was numerically

equal to the average annual rainfall in inches in the area from which the milk was collected. The effect of the Windscale accident on the Cs<sup>137</sup>/K ratio in dried milk is shown to have been temporary. The Cs<sup>137</sup>/K ratio in man in late 1957 was about the same as that in dried milk from an area having a similar rainfall.

SPECTOR, H. & CALLOWAY, D. H. (1959). **Reduction of X-radiation mortality by cabbage and broccoli.** —*Proc. Soc. exp. Biol., N.Y.* **100**, 405-407. [Authors' summary modified.] 3561

Young male g.pigs fed a basal diet of bran and oats plus ascorbic acid were exposed to 400 r of whole-body X-radiation. All died within 15 days. Supplementation of the diet with cabbage or broccoli for 2 weeks before and/or 30 days after irradiation reduced mortality. Freeze-dried cabbage also reduced mortality. Feeding both before and after exposure gave the greatest protection.

SENIOR, B. J. & SHEEHY, E. J. (1959). **The feeding of antibiotics to chicks and pigs.** —*J. Dep. Agric. Republ. Ireland* **54**, 5-43. 3562

Group feeding tests with 1,500 chicks showed that penicillin (6.3 g./ton of meal) and aureomycin (18 g./ton of meal) produced birds with weights increased by 5-20%. The maximum growth effect occurred at the age of 8 to 10 weeks; by 6 months the increment due to the antibiotic had disappeared.

It was noted that breeding fowls that had been fed a vegetable protein diet provided insufficient vitamin B<sub>12</sub> for their progeny.

Using the same antibiotics in normal rations of pigs, in only one test was a weight increase produced. High energy, low fibre diet proved less effective than the usual more bulky ration; probably because of its constipating effect. Addition of the antibiotics to the diet of unthrifty pigs produced little improvement, probably because unthriftiness was due to helminth parasites and scabies.

—BRENDA M. WILSON.

COATES, M. E. & DAVIES, M. K. (1959). **The effects of continuous administration of penicillin to successive generations of chicks.** —*Brit. J. Nutr.* **13**, 205-212. [Authors' summary modified.] 3563

Two flocks of Light Sussex were maintained for three generations, one with and the other without a procaine penicillin supplement in the diet. The growth response to penicillin of successive generations was measured, and

egg production, hatchability and mortality were recorded.

There was no evidence of any detrimental effects of the antibiotic but some indications of a lower mortality and a slight improvement in the performance of mature hens given penicillin and in the weight of their progeny. These effects, however, were not cumulative throughout the three successive generations.

Results for the past 5 years are presented for the growth response to penicillin of commercially bred chicks reared to 4 weeks of age in the laboratory. No change was observed in the magnitude of effect of the antibiotic or in the absolute weights of the birds.

BLAIR, J. W., PAGE, H. M. & ERWIN, E. S. (1959). Proposed method for determining biological value of protein in ruminants.—*Proc. Soc. exp. Biol., N.Y.* **100**, 459-461.

[Authors' summary modified.] **3564**

A method is proposed for estimating the comparative value of nitrogen sources in ruminants and the anabolism of protein stimulated by drugs. The percentage of N in the urinary creatinine is divided by the apparent N digested (expressed as a decimal) in animals with similar intake of N per unit of body weight.

VALLANCE, W. S. & McCLYMONT, G. L. (1959).

Depression in percentage of milk fat by parenteral glucose infusion and glycerol feeding.—*Nature, Lond.* **183**, 466-467. **3565**

Low roughage-high concentrate diets can depress the fat content of milk considerably. The hypothesis is advanced that this is the result of an increase in the proportion of glycogenic to non-glycogenic products of digestion on such diets. To test this, cows on ordinary hay and concentrate diets with normal milk fat percentages, were given i/v infusions of glucose over 48 hours. Milk secretion was not reduced but fat percentage was rapidly depressed. The feeding of glycerol had the same effect.

—E. J. CASTLE.

BOHSTEDT, G. (1959). Minerals for livestock.—*Illinois Vet.* **2**, 1-4. **3566**

Rations of dairy cows may contain an excess of calcium over phosphorus. This depresses digestibility of protein, energy, phosphorus, iodine, iron and manganese. It can also reduce weight gain and feed economy of fattening pigs and may predispose dry cows to milk fever by depressing the parathyroids.

An adequate salt intake is of great importance to pigs and it is not poisonous if the animals have free access to water.

—E. J. CASTLE.

MITIDIERI, E., AFFONSO, O. R. & TOKARNIA, C. H. (1959). Copper and iron in livers of undernourished cattle and sheep from north-eastern and northern Brazil.—*Amer. J. vet. Res.* **20**, 247-248. [Authors' summary modified.] **3567**

Analysis of the Cu and Fe content of the liver in cattle and sheep from Brazil is given. The Cu content was low in all animals in the coastal area. Many livers had a high Fe content, which was only partly associated with low Cu content.

IRVING, E. A. (1959). The persistence of cobalt in the liver of cobalt drenched sheep.—*Aust. vet. J.* **35**, 88-89. **3568**

Four groups of sheep with different liver cobalt contents were used to study the persistence of cobalt in the liver after drenching with 30 mg. of cobalt sulphate.

Two days after drenching all had high liver cobalt (0·21-0·29 p.p.m. dry matter) irrespective of their previous status. The cobalt reverted to its previous levels between 10 and 30 days after drenching.

High levels (0·64-5·7, as compared with normal values of 0·1-0·2 p.p.m. dry matter) are found in the liver of sheep which have received a cobalt "bullet". There is no evidence of how long these high levels last after destruction of the bullet.—A. G. CULEY.

MACINTYRE, I. (1959). Some aspects of magnesium metabolism and magnesium deficiency.—*Proc. R. Soc. Med.* **52**, 212-214. **3569**

<sup>28</sup>Mg. was administered by i/p injection to five hooded rats weighing 171-202 g. The animals were killed at intervals up to two days, and samples of the various tissues assayed for radioactivity and total magnesium content. Results showed that (a) most of the bone magnesium does not exchange rapidly, (b) at 24 hours the specific activity in muscle is less than half that of plasma, and (c) the magnesium in the vital organs exchanges much more rapidly. It was concluded that the high intracellular concentration of magnesium is maintained by a mechanism other than membrane permeability, possibly by active transport. It was emphasized that the element in the vital organs is rapidly exchangeable, and a low serum magnesium, even if only transitory, may be disadvantageous to the kidney.

The first symptom of magnesium deficiency in rats was intense transitory vasodilatation in the ears, possibly caused by an increase in adenine nucleotides in the blood; the pathogenesis will be investigated.

—D. S. PAPWORTH.

SIMESEN, M. G. (1959). Experimental hypomagnesaemia. — *Proc. XVIth Int. vet. Congr., Madrid* 2, 85-87. **3570**

Cows after 14 days of normal stall feed, were fed grass cut from plots of a 6-year-old pasture which had been fertilized with either ammonium sulphate or calcium nitrate and stored at -20°. The ammonium sulphate treated grass caused pronounced hypomagnesaemia (0.5 mg.% or less), whilst the calcium nitrate treated grass caused a slight decrease in serum magnesium levels (1.7 mg.%) and a pronounced decrease in the level of inorganic P in the serum (2.2 mg.%). The content of ammonia in the rumen fluid increased when grass from either plot was fed. Precipitation of magnesium ammonium phosphate probably occurs so that the large quantities of magnesium contained in grass pass through the intestinal tract without being absorbed.—A. ACKROYD.

TAYLOR, T. G. (1959). The magnesium of bone mineral. — *J. agric. Sci.* 52, 207-216. [Author's summary modified.] **3571**

The magnesium of bone was present in two main forms, one relatively soluble and the other relatively insoluble in dilute acids. A large proportion (at least 70%) of the total bone magnesium was located on the surfaces of the bone crystals.

Magnesium carbonate did not occur in significant amounts in bone salt.

These results were discussed in relation to the hypomagnesaemia of lactating cows.

FIELD, A. C. (1959). Balance trials with magnesium-28 in sheep. — *Nature, Lond.* 183, 983. **3572**

A single dose of magnesium-28 was given daily to a single sheep either into the rumen through a fistula, or into the jugular vein by means of a nylon catheter. The Mg content of hay fed was known, and the faeces and urine were collected twice daily and radioactivity determined in a modified ring counter. It was shown that the true availability of dietary Mg can be determined with <sup>28</sup>Mg, and is in good agreement with values estimated for similar sheep using indirect methods.

—D. S. PAPWORTH.

GRÖNING, M. (1959). Über den Einfluss von Schwefel auf den Magnesiumstoffwechsel beim Rind. [Influence of sulphur on magnesium metabolism in cattle.] — *Inaug. Diss. Hanover* pp. 64. **3573**

A review of the literature revealed that the apparent absorption of Mg in cattle is 20-25% whereas in man, dog, pig and rat it is on the average 39%. In 2 bulls, aged 10 and 12 months, the apparent absorption of Mg was 33% and 18.5%, respectively, on a diet of hay and dried sugar beet pulp and 16% and 7.5% on a diet of hay and "Troblako" [composition not stated]. When sodium sulphate was fed, at rates of 0.18-0.29 g./kg. body wt. daily, there was a slight rise in Mg absorptio on the diet of hay and dried sugar beet pulp but a fall on the hay and "Troblako" diet. Urinary excretion of Mg decreased consistently when sulphate was fed. The Mg content of the blood was unaffected. It is concluded that sulphate is not a decisive factor in the development of grass tetany.—M.G.G.

ANON. (1959). Magnesium depletion. — *Lancet* April 18th, 820-823. **3574**

Magnesium depletion is seldom recognized in man, and diagnosis is not easy. Experiments with animals have shown that there is an association between magnesium depletion, hypercalcaemia and calcification of the kidney and also with a fall in the potassium content of the muscles. A few cases of magnesium deficiency in man are described. Tetany and vasodilatation are rare.—E. J. CASTLE.

WALSH, T., KILROY, J. & McDONNELL, P. M. (1959). Some aspects of the potassic manuring of pastures. — *J. Dep. Agric. Republ. Ireland* 54, 44-62. **3575**

It was noted that the split-dressing technique of applying potassic fertilizer to grass swards with a heavy dressing of nitrogen produced yields of over 7 tons of D.M. per statute acre; similar potassium dressings to grass-clover swards with no nitrogen yielded over 5 tons of D.M./acre. The technique resulted in the more even distribution of potassium in the crop, optimum results for dried grass being obtained with 4-5 cwt. of muriate of potash/acre, and for dried grass and hay under low conditions of potassium supply in the soil, usually 1½-2 cwt. sufficed. The element has a direct effect on grass, although clover has the greater capacity to extract it from the soil.

Little potassium was found in organic

matter in the soil. Herbage analysis gives a useful index of potash requirements of grasslands etc. No evidence was found that grass tetany is due to high levels of potassium in herbage.—BRENDA M. WILSON.

CONNELL, R., WHITING, F. & FORMAN, S. A. (1959). *Silica urolithiasis in beef cattle. I. Observation on its occurrence.*—*Canad. J. comp. Med.* 23, 41-46. [Summary in French.]

3576

The wide occurrence of obstructive urolithiasis in beef cattle in western Canada is discussed and results of observations and experimental studies presented. Uroliths generally have silica as the chief constituent and have been found in the urinary tract from the renal cortex to the prepuce. In many instances a non-obstructive form of urolithiasis has been observed on slaughter.

Causation is obscure, but in general, bovine urolithiasis is considered to be nutritional in origin.—R. V. L. WALKER.

KEELER, R. F. & LOVELACE, S. A. (1959). *The metabolism of silicon in the rat and its relation to the formation of artificial siliceous calculi.*—*J. exp. Med.* 109, 601-614. [Authors' summary modified.]

3577

The urinary excretion of silicon in the rat was enhanced by the administration of silicon. Ethyl silicate enhanced the excretion more than magnesium trisilicate, sodium metasilicate, or sodium silicate. Rats tolerated sustained daily doses (by stomach tube) of ethyl silicate equivalent to about 15 to 30 mg. Si. Urinary silicon excretion was a straight line function of the concentration of ethyl silicate administered, about 18% of the dose given appearing in the urine at all levels tested. Using sustained dietary additions of ethyl silicate as a means of enhancing urine silicon levels, artificial siliceous urinary calculi were consistently produced on zinc pellets implanted in the bladders of rats.

UDALL, R. H. (1959). *Studies on urolithiasis. III. The control by force feeding sodium chloride. IV. The effects of the ration on the predisposition as measured by the urinary mucoproteins.*—*Amer. J. vet. Res.* 20, 423-425 & 426-429.

3578

The author confirmed that urolithiasis could be prevented by adding 10% NaCl to meal pellets known to produce the disease [see also *V.B.* 28, 530]. The mode of action of salt was discussed. 5 of 7 lambs given the pelleted meal without salt died from urolithiasis just

after a severe snowstorm. This appeared to confirm field observations that urolithiasis was associated with cold weather.

There is evidence from human medicine that calculus formation commences with the formation of a mucoprotein complex. Udall studied the excretion of mucoproteins in the urine of lambs, and found that it was directly related to the proportion of concentrates in the diet.—R.M.

DONE, J. T., HARDING, J. D. J. & LLOYD, M. K. (1959). *Meningo-encephalitis eosinophilica of swine. II. Studies on the experimental reproduction of the lesions by feeding sodium chloride and urea.*—*Vet. Rec.* 71, 92-96.

3579

22 pigs in all were fed meal containing either (1) 5·3% sodium chloride, (2) 9·4% sodium chloride, (3) 3·0% sodium chloride and 7·5% urea, (4) 15·0% urea or (5) 3·0% sodium chloride, and water was restricted to about  $2\frac{1}{2}$  times the weight of meal. The first three treatments produced the typical signs and lesions of meningo-encephalitis eosinophilica, 15% urea produced similar lesions except that perivascular eosinophile infiltration did not occur, but 3% sodium chloride produced no abnormality. It is suggested that the lesions are due to a disturbed water balance with the exception of the eosinophile infiltration which is a characteristic effect of the sodium ion. Macroscopic and microscopic lesions are described and illustrated by 6 photographs.

The authors recommend that sodium chloride should not be added to pig meals and that water should be unrestricted.

—E. J. CASTLE.

GRANT, C. A. & THAFVELIN, B. (1959). *Selenium and hepatosis diaetetica in pigs.*—*Proc. XVIth Int. vet. Congr., Madrid* 2, 75-78.

3580

Hepatosis diaetetica (toxic liver dystrophy) is believed to be identical with experimental dietetic liver necrosis in rats produced by a concomitant deficiency of tocopherols and the sulphur-containing amino-acids and the absence of a substance described by Schwarz as Factor 3 which has been found to contain selenium. Experimentally selenium salts in micro-amounts (0·2 mg. sodium selenite per kg. feed), like the sulphur-containing amino-acids, are effective in completely suppressing the florid liver lesions characteristic of hepatosis diaetetica, but not other lesions, whilst alpha-tocopherol has a wide range of morphological activity. Although

effective control of the spontaneous disease by dietary manipulations has proved difficult, for the present, the use of selenium salts to prevent or treat the disease is not recommended owing to their toxicity.—A. ACKROYD.

MUTH, O. H., OLDFIELD, J. E., SCHUBERT, J. R. & REMMERT, L. F. (1959). White muscle disease (myopathy) in lambs and calves. VI. Effects of selenium and vitamin E on lambs.—*Amer. J. vet. Res.* **20**, 231-234. [Authors' summary modified.] **3581**

Five lots each of 12 pregnant ewes were fed: (1) a control ration; (2) an experimental ration capable of causing white muscle disease; (3) the experimental ration plus vitamin E parenterally; (4) the experimental ration plus vitamin E orally; and (5) the experimental ration plus 0·1 p.p.m. Se as sodium selenite. The lambs born had a high incidence of white muscle disease, except those from ewes fed the control ration or the ration supplemented with Se.

DIEHL, J. F. (1959). Amino aciduria of E-avitaminosis. Exceptional role of glycine.—*Proc. Soc. exp. Biol., N.Y.* **100**, 657-658. [Author's summary modified.] **3582**

D. confirmed that excretion of free amino nitrogen in urine is elevated in dystrophy of rabbits fed a vitamin E-free diet. Glycine excretion was not increased.

MOORE, T., SHARMAN, I. M. & WARD, R. J. (1959). Cod-liver oil as both source and antagonist of vitamin E.—*Brit. J. Nutr.* **13**, 100-110. **3583**

When rats were fed a vitamin E-deficient diet containing lard, 0·25 mg.  $\alpha$ -tocopherol weekly was necessary to prevent symptoms of deficiency. Cod-liver oil contained 10 mg. of  $\alpha$ -tocopherol per 100 g. but when 10% was given in the deficient diet, providing 1·0 mg.  $\alpha$ -tocopherol weekly, symptoms of vitamin E deficiency developed, unless adequate doses of  $\alpha$ -tocopherol were given in addition. 30% cod-liver oil in the diet was also ineffective.

The unsaponifiable fraction of the cod-liver oil counteracted the increased tendency to haemolysis in vitamin E-deficient rats. The amounts required were consistent with the vitamin E content as estimated chemically. The failure of whole cod-liver oil to act as an active source of vitamin E may be explained by the antagonistic action of the other components, especially the highly unsaturated fatty acids.—E. J. CASTLE.

IRVING, E. A. (1959).  $\alpha$ -Tocopherol and hyaluronidase *in vivo*.—*Nature, Lond.* **183**, 398. **3584**

Three groups of four chickens were fed: (1) basal ration low in vitamin E, (2) basal plus 14 i.u. vitamin E per lb., (3) a commercial ration. After five weeks two birds in each group were injected i/p with 6,000 i.u. of hyaluronidase daily for seven days. On the eighth day these and the controls were killed and examined P.M. The birds in group 1 given hyaluronidase had haemorrhages and advanced exudative diathesis. The remaining birds in group 1 had slight haemorrhages in the muscles and so did those in group 3 receiving hyaluronidase. All other birds were normal, indicating that the vitamin E regulated the hyaluronidase activity.—E. J. CASTLE.

GRIFFITHS, T. W. (1959). Relative rates of liver storage of pure  $\alpha$ -,  $\beta$ -,  $\gamma$ - and  $\delta$ -tocopherols in the growing chick.—*Nature, Lond.* **183**, 1061-1062. **3585**

Twenty-four chicks, aged 6 weeks, were fed a diet low in vitamin E for 3 weeks. Groups of 6 of the chicks were then dosed orally with either pure  $\alpha$ ,  $\beta$ ,  $\gamma$  or  $\delta$ -tocopherol over a period of five days. Two days later they were killed. The relative recovery of tocopherol in the livers was  $\alpha$ -100,  $\beta$ -41·2,  $\gamma$ -18·7 and  $\delta$ -Nil. No tocopherol was identified in the blood.—E. J. CASTLE.

HELGEBOSTAD, A., SVENKERUD, R. R. & ENDER, F. (1959). Experimentell biotinmangel hos mink og rev. [Biotin deficiency in mink and foxes.]—*Nord. VetMed.* **11**, 141-161. [In Norwegian. Summaries in English and German. English summary modified.] **3586**

Experimental biotin deficiency was produced in foxes and mink by feeding 30% of the protein in the diet as raw egg white.

Pronounced changes were seen on the skin and in the fur, and fur and tail biting were common.

"Wet belly" resulting in discoloured fur was observed on male animals.

After an experimental period of 3-4 months disturbances appeared in the general condition in the form of conjunctivitis, reduced appetite, cautious gait, apathy and sometimes yellowish-brown thin faeces. Eight untreated mink died: P.M. examination revealed that changes were most prominent in the liver. They appeared as severe degenerative fatty infiltration. The kidneys and myocardium revealed considerable deposits of sudanophile substance. Parenteral administration of 1 mg.

biotin twice a week caused quick improvement. The experiments lasted from 4-8 months and included 25 mink and 19 silver foxes of which 11 mink and 5 foxes were controls. Instead of raw egg white the controls were fed an equal quantity of cooked egg white. They were normal and did not show signs of illness or changes of the skin during the experimental period.

MENKE, K. H. (1959). Untersuchungen über das Stoffwechselverhalten des Kobalts und des Vitamins B<sub>12</sub> im Huhn, sowie über die Biosynthese des Vitamins B<sub>12</sub> nach oraler Verabreichung von anorganischem Kobalt. [Synthesis of vitamin B<sub>12</sub> in fowls dosed with inorganic cobalt.]—*Arch. Geflügelk.* 23, 32-38. [Summary in English.] **3587**

Six hours after administration of labelled CoCl<sub>2</sub> to fowls, at least 95% of the cobalt was in the form of organic complexes most of which were not cobalamins. After 24 hours 50-60% of the radioactivity in the faeces and 70-75% in the caecal contents was in the form of cobalamins; 20% of these cobalamins were vitamin B<sub>12</sub>. In the liver, 6-12 hours after administration, 58% of the radioactivity was in the form of cobalamins, but only 7% of the cobalamins were vitamin B<sub>12</sub>. It was calculated that 0·5% of the cobalt was utilized as vitamin B<sub>12</sub>.—M.G.G.

DUTT, B. & KEHAR, N. D. (1959). Incidence of goitre in goats and sheep in India.—*Brit. vet. J.* 115, 176-178. [Authors' summary modified.] **3588**

Thyroid glands from goats and sheep slaughtered at Bareilly (United Provinces, India) were weighed and examined microscopically. About 10% of the goats were found to be goitrous, the condition being more common in females and castrated males. Enlargement of the thyroid was unaccompanied by other symptoms such as dwarfism. None of the sheep were affected.

REID, R. L. & HOGAN, J. P. (1959). Studies on the carbohydrate metabolism of sheep. VIII. Hypoglycaemia and hyperketonaemia in undernourished and fasted pregnant ewes.—*Aust. J. agric. Res.* 10, 81-96. **3589**

The influence of food intake and fasting on blood levels of glucose, ketone bodies, volatile fatty acids (V.F.A.) and citrate was studied in ewes fed a sub-maintenance diet.

Pre-feeding ketone levels tended to vary inversely with blood glucose as did fasting levels, except, in either case, when hyper-

ketonaemia was severe. Pre-feeding hypoglycaemia was greater and the post-prandial rise in blood glucose less in multi-gravid ewes.

Blood citrate increased after feeding, and was correlated with the rise in blood glucose. A large increase in glucose with feeding was usually associated with a fall in ketones and normal V.F.A. levels. Small rises in glucose were often associated with unchanged ketones and high V.F.A. levels. Mean values for ketones and V.F.A. were highly correlated in the post-feeding period.

The interrelationships of blood glucose, ketones, V.F.A. and citrate and their significance in pregnancy toxæmia are discussed.

—C. GALLAGHER.

KRONFELD, D. S., CAMPBELL, L. A., HOOPER, L. L. & GALLIGAN, S. J. (1959). Acidosis and plasma glucose in sheep given butyrate.—*Amer. J. vet. Res.* 20, 430-433. [Authors' summary modified.] **3590**

Sodium butyrate and butyric acid were infused intravenously and intraruminally into adult ewes. Plasma glucose concentration and the CO<sub>2</sub>-combining power of plasma decreased after butyric acid was given, but after the sodium salt there was no acidosis and the plasma glucose increased. It was concluded that acidosis interfered with the glycogenic effect of butyrate. Implications of this were discussed with reference to ruminant ketosis.

WESTERMARCK, H. W. (1959). Prevention of paresis puerperalis with ACTH.—*Proc. XVIth Int. vet. Congr.*, Madrid 2, 153-154. **3591**

None of 8 cows with a history of puerperal paresis treated after parturition with corticotrophin (ACTH) in doses of 1,000 U.S.P. units developed paresis but 3 of a control group did. When the control cows were treated with ACTH the following year, none developed paresis whilst 3 of the previously treated group did and 2 later developed ketosis. Treatment of the ketosis with ACTH caused a rise in the blood sugar levels from 34 to 70 mg.% in one day. Potassium levels in the blood increased after parturition in the ACTH treated cows.

—A. ACKROYD.

WARD, G. M. & VAIR, C. (1959). A calcium lactate-aluminium hydroxide preparation as a preventive for parturient paresis.—*J. Amer. vet. med. Ass.* 134, 520-523. [Authors' summary modified.] **3592**

Nineteen mature cows, 17 of which had been previously affected with parturient

paresis, were treated with a calcium lactate-aluminium hydroxide product (Paracalcin) before parturition. Six of the 19 developed parturient paresis. Their blood serum calcium and phosphorus levels were not greatly different from those previously reported for cows with parturient paresis.

In two other herds, 130 mature cows with histories of parturient paresis were treated with the same product and 6 cows developed parturient paresis. The addition of 500 i.u. of vitamin D per day did not improve the efficiency of the product.

SCHMIDT, G. H. & SCHULTZ, L. H. (1959). Effect of three levels of grain feeding during the dry period on the incidence of ketosis, severity of udder edema, and subsequent milk production of dairy cows.—*J. Dairy Sci.* 42, 170-179. 3593

For 2 years a herd of 63 cows of four breeds was subjected to 3 different feeding treatments during the eight-week dry period : (1) no grain, (2) 6 lb. grain daily and (3) 15 lb. grain daily. Silage was fed according to body weight and hay *ad libitum*. After calving grain was fed according to production.

No statistical differences in milk, butterfat, or 4% fat-corrected milk were obtained between the treatments, either for the first 84 days or the whole of a lactation. The severity of udder oedema was not significantly affected by treatment though it was correlated with milk production. Blood sugar and ketone levels differed little between groups. Two cases of ketosis occurred on each of the treatments 2 and 3 and one case on treatment 1.

—E. J. CASTLE.

BACH, S. J. & HIBBITT, K. G. (1959). Biochemical aspects of bovine ketosis. — *Biochem. J.* 72, 87-92. [Authors' summary modified.] 3594

The sera of 70 Jersey cows, half of them with ketosis, were analysed for their content of twelve blood constituents. These included four members of the citric acid cycle (pyruvate, citrate,  $\alpha$ -oxoglutarate and succinate).

A relationship was established between the high concentration of serum ketone bodies and the very low conc. of glucose, so that either

*See also absts. 3367 (antibiotics); 3681 (book).*

#### DISEASES, GENERAL

SOMOVA, A. G., SILICH, V. A., POLYAKOV, I. I., KHAKHINA, Z. D. & GERASYUK, G. C. (1959). [Experimental mixed infection with Q fever

phenomenon can be used to assess the severity of the disease.

No significant differences between normal and diseased animals were found for amino-nitrogen, urea, ammonia and cholesterol.

In all pathological cases the pyruvate and  $\alpha$ -oxoglutarate in serum were several hundred per cent. above normal and this was paralleled by a strong depression of the amounts of citrate and of succinate.

It was concluded that in bovine ketosis there may exist an interference with the citric acid cycle, notably with those reactions in which pyruvate and  $\alpha$ -oxoglutarate are converted into citrate and succinate respectively. From the known similarity of the mechanism of the two reactions a deficiency in co-factors common to both was suspected, such as coenzyme A and adenosine triphosphate; the compatibility of such a deficiency with certain symptoms in ketonaemia is discussed.

VIGUE, R. F., FITZGERALD, W. H. & CASTLE, R. F. (1959). Management of lactation ketosis.—*Vet. Med.* 54, 129-131. 3595

Ultracortenol (prednisolone trimethyl-acetate) has certain advantages over the other glucocorticoids in the treatment of ketosis and 29 additional cases have been treated with 50-250 mg. It was advantageous to give glucose with doses under 100 mg. The optimum dose was 100-250 mg. and this generally caused remission of symptoms in 79-96 hours. Milk production was usually depressed for about 24 hours after injection of the hormone unless glucose was given also.

—E. J. CASTLE.

PAOLUZZI, L. & BATELIO, E. (1957). Il propionato sodico e la microflora batterica del rumine nel trattamento dell'acetosi puerperale del bovino. [Sodium propionate and rumen microflora in the treatment of bovine ketosis.] —*Gazz. Vet., Milano* No. 4, pp. 1-14. 3596

Ketosis in cows was treated with sodium propionate or with a preparation of rumen bacteria, "Bovinoculum". Results, which were equally satisfactory with either treatment, are compared with those of other lines of treatment.—T.E.G.R.

and brucellosis. I. The course of Q fever.]—*J. Microbiol., Moscow* 30, No. 3 pp. 100-106. [In Russian.] 3597

POLYAKOV, I. I., SOMOVA, A. G., SILICH, V. A., KHAKHINA, Z. D. & GERASYUK, G. C. (1959). [Experimental mixed infection with Q fever and brucellosis. II. The course of brucellosis.]—*Ibid.* 106-110. [In Russian.] 3598

I. 100 g.pigs were infected with the two agents either simultaneously or separately. Brucellosis did not interfere with the clinical and serological course of Q fever, except when rickettsia infection occurred a month after brucella infection, in which case Q fever appeared to be accelerated (higher fever, higher c.f. titres and more rapid disappearance of rickettsia from the body). Since the two causal agents had no common antibody, positive serological tests to both agents were an indication of mixed infection.

II. When *R. burnetii* was inoculated with or before *Br. melitensis*, the course of brucellosis was accelerated and reactivity to serological and allergic tests for brucellosis was reduced. [See also *V.B.* 29, 2393.]—R.M.

YOUNG, G. A., UNDERDAHL, N. R., SUMPTION, L. J., PEO, E. R., JR., OLSEN, L. S., KELLY, G. W., JR., HUDMAN, D. B., CALDWELL, J. D. & ADAMS, C. H. (1959). Swine repopulation. I. Performance within a "disease-free" experiment station herd.—*J. Amer. vet. med. Ass.* 134, 491-496. [Authors' summary modified.] 3599

A "disease-free" herd of pigs was established by hysterectomy 1-3 days before term and rearing the piglets without colostrum, in isolation for four weeks. These pigs were placed in a clean farm environment, without direct or indirect contact with other pigs, reared to maturity, mated, and the next generations were farrowed normally and suckled by their dams.

Naturally farrowed pigs from dams obtained by hysterectomy had high levels of performance. In 112 litters, during 1957-58, 8 pigs per litter were reared with average weights of 41 lb. when weaned (at 56 days), and of 213 lb. at 154 days. The average daily gain was 1.75 lb. Feed efficiency was not determined for all pigs. The conversion ratio was essentially 3 lb. of feed for 1 lb. of gain as judged by tests on 379 pigs farrowed in spring 1958.

Atrophic rhinitis and virus pneumonia of pigs were eliminated from the herd: examination of the lungs and nasal cavities at slaughter revealed no lesions of either disease.

The methods of procuring and rearing "disease-free" pigs are simple enough to be

used in a practical national programme to eliminate or greatly reduce the incidence of these two diseases in pigs.

HUGHES, J. P. & KENNEDY, P. C. (1959). Traumatic reticulitis—An outbreak in a large dairy.—*J. Amer. vet. med. Ass.* 134, 383-386. [Authors' summary modified.] 3600

The condition occurred in 25 of 1,000 cows within two months. It was caused by baling wire, probably picked up by the green-feed chopper and cut into short lengths and distributed in the feed.

BÖMER, H. (1959). Die Behandlung der Urovagina mit Dondren. [Treatment of "urovagina" with Dondren.]—*Prakt. Tierarzt.* No. 2, pp. 39-41. 3601

Sixteen cows affected with vaginal prolapse and accumulation of urine in the vagina were given perivaginal injections of "Dondren", a preparation of mineral oil in soft paraffin. Twelve later conceived.—M.G.G.

SANFORD, J. (1959). Some factors affecting the motility of the sheep's stomach.—*Vet. Rec.* 71, 449. 3602

It has been suggested that the diet may sometimes contain substances which release histamine from the tissues and that this may explain some cases of ruminal stasis. The tissues of the reticulum, rumen and omasum of the sheep contain little histamine, but the content in the abomasal mucosa is high. The abomasum is therefore the most likely site of this action. A study of the influence of various dietary constituents on the release of histamine may throw light on the problem.—M.G.G.

GOUZE, H. E. & ELLIOTT, R. F. (1959). Edema disease in swine. Clinical evaluation of acetazolamide sodium.—*Vet. Med.* 54, 295-298. [Authors' summary modified.] 3603

The authors discussed clinical reports on the use of acetazolamide sodium for the treatment of oedema disease. 125 (86.8%) of the 144 treated pigs recovered, including 20 of the 25 advanced cases with poor prognosis. There is reasonable evidence that acetazolamide sodium in the drinking water is helpful in preventing further cases in an affected herd. No untoward effects from the treatment were observed.

A daily dose of 2 to 5 mg. acetazolamide sodium per lb. body wt. administered intramuscularly or in the drinking water seems to be effective for the treatment and control of oedema disease in swine.

GWATKIN, R., CORNER, A. H. & L'ECUYER, C. (1959). Rhinitis of swine. XI. Search for inclusion bodies during the development of atrophic rhinitis in artificially infected pigs.—*Canad. J. comp. Med.* 23, 84-90. [Summary in French.] **3604**

Nine experiments to determine whether inclusion bodies would appear in young pigs during the course of development of atrophy following introduction of infective material failed to support the idea that inclusion body rhinitis virus is a necessary factor in the type of atrophic rhinitis found in Canada. On the other hand the results do not exclude the possibility of the virus preparing the tissue for a more severe infection or the specific type of rhinitis.—R. V. L. WALKER.

TOBLER, J. (1959). Über das Auftreten einer pustulösen Dermatitis bei Schweinen im belgischen Kongo. [Pustular dermatitis in pigs in the Belgian Congo.]—*Wien. tierärztl. Mschr.* 46, 32-37. [Summaries in English and Italian.] **3605**

Pustular dermatitis appeared from June to October in 2 successive years in a herd of 500 pigs. Mortality was 70% in the first year, but only 5% in the second. In the third year, after the open drain running through the sties had been covered and the level of the floor raised, there were only a few benign cases. The other symptoms were loss of appetite, fever and constipation. Staphylococci were isolated from the pustules. Vaccines prepared from these staphylococci were ineffective. The disease is considered to have been due to the cold and damp. At night the humidity rose at times to 90% and the air temp. fell to 10°C.  
—M.G.G.

MOKRII, F. U., GRITSYUTA, I. E. & KUSHNIR, G. G. (1959). [Gastroenterocolitis in pigs.]—*Veterinariya, Moscow* 36, No. 4 pp. 58-59. [In Russian.] **3606**

A disease which affected within 2 days all pigs in a large piggery was manifested by loss of appetite, increased thirst, vomiting, diarrhoea (green or grey faeces). There was no fever. 40% of the pigs died and most of these also had chronic pneumonia. Examination of the gastro-intestinal tract revealed hyperaemia throughout. No pathogenic bacteria were isolated. Two pigs developed the condition after being fed small intestine from an affected pig. A similar disease was reported from another part of Russia in 1956.—R.M.

MITTELHOLZER, L., JR. (1959). Ultracortenol bei der Behandlung der Schweinemastitis. [Prednisolone in the treatment of mastitis in sows.]—*Schweiz. Arch. Tierheilk.* 101, 252-254. [Summaries in English, French and Italian.] **3607**

Fifteen sows that developed acute mastitis shortly after parturition recovered quickly after i/m injection of prednisolone trimethyl acetate, in combination with antibiotics and pituitary extract. The dosage was 5 ml. (125 mg.) daily for 2 days.—M.G.G.

ROMAGNOLI, A. (1958). Sull'impiego della biopsia epatica. [Liver biopsy in the dog.]—*Atti. Soc. ital. Sci. vet.* 12, 715-717. [Summaries in English and French.] **3608**

The technique for liver biopsy (with a Vim-Silverman needle) in the dog is described and discussed.—T.E.G.R.

PALLIOLA, E. & GUARDA, F. (1957). Contributo allo studio delle correlazioni fra lesioni entero-epato-renali nel cane. Ricerche istologiche ed istochimiche. [Intestinal, hepatic and renal lesions in chronic nephritis in the dog.]—*Ann. Fac. Med. vet. Torino* 7, 217-232. [Summaries in English, French and German.] **3609**

The gross and histochemical aspects of intestinal, hepatic and renal lesions associated with chronic nephritis in dogs are described. The correlation between these concurrent conditions is discussed and the opinion expressed that they constitute a disease entity, an entero-hepato-renal syndrome, caused by altered protein metabolism.—T.E.G.R.

RÜSSE, M. (1959). Der Wert der Blutharnstoff-Bestimmung mit dem Urometer nach Kowarsky bei der Endometritis der Hündin. [Determination of urea in the blood of dogs with endometritis.]—*Berl. Münch. tierärztl. Wschr.* 72, 34-37. [Summary in English.] **3610**

Blood urea estimation is used for prognosis of pyometra operation. Using the Kowarsky urometer, the principle of which is explained, readings should be correct to within 2-6 mg%. The amount of blood urea indicates the degree of nephritis. Permanent kidney damage cannot be distinguished by this method from temporary tubulonephrosis. Normal blood urea is taken as 20-60 mg%. Recovery chances are best when blood urea is below normal, decrease as blood urea increases, and are poor at above 90 mg%.—IRENE M. DIXON.

THOMPSON, S. W., SULLIVAN, D. J. & PEDERSEN, R. A. (1959). *Calcinosis circumscripta. A histochemical study of the lesions in man, dogs, and a monkey.*—*Cornell Vet.* **49**, 265-285. **3611**

The authors give a detailed description of calcinosis circumscripta in formalin-fixed tissues from five human beings, eight dogs and one monkey. The lesion is described as a multilocular, subcutaneous, granulomatous, necrotic focus, the centre of which has become mineralized. The minerals consisted of carbonates, phosphates, oxalates, sulphates and possibly other anions mostly present as calcium salts.—R. N. FIENNES.

RYABOV, V. I. (1958). [Biological action of X-rays on sheep.]—*Bull. Informatsii Vsesoyoz. Inst. eksp. Vet.* No. 3 pp. 9-10. [In Russian.] **3612**

18 sheep aged 1-2½ years, of 3 different breeds, were exposed to a single dose of between 25 and 500 r of X-rays. Sheep receiving 500 r developed acute radiation sickness. No illness was observed in sheep which received 300 r, but there was evidence of leucocytosis with subsequent prolonged leucopenia. Doses between 25 and 200 r appeared to cause no changes, apart from alteration in the white blood picture, and healthy lambs were born to ewes irradiated at full term.—R.M.

*See also abst. 3680 (book).*

## POISONS AND POISONING

CATCOTT, E. J. (1959). Veterinary aspects of air pollution research.—*J. Amer. vet. med. Ass.* **134**, 434-436. **3613**

Two groups of cockerels were observed for 3 months in areas with supposedly contrasting degrees of air pollution. Both groups remained in good health and no differences were seen at gross examination of the body tissues and microscopic examination of the respiratory tract. Records of animal production and mortality from Los Angeles showed no apparent relation with the occurrence of severe air pollution. [See also *V.B.* **29**, 1198.] —M.G.G.

LINK, R. P. (1959). Chemical poisonings in animals.—*Mod. vet. Pract.* **40**, No. 1. pp. 36-43. **3614**

A review of the sources, toxic action, clinical signs, diagnosis, P.M. findings and treatment of poisoning by lead, arsenic, mercury, nitrate, coumarin, chlorinated hydrocarbon and organic phosphorus parasiticides, and sodium fluoroacetate.—M.G.G.

BOTHA, D. H. (1958). Is BHC-behandelde weiding nadelig vir skape? [Is pasture sprayed with BHC harmful for sheep?]—*S. Afr. J. agric. Sci.* **1**, 341-355. [In Afrikaans. Summaries in English and French. Abst. from English summary.] **3615**

Pastures were sprayed or dusted 6 times at intervals of a few weeks with 43% BHC (6% gamma isomer) at rates of 5-25 lb. per acre. Sheep grazing them grew normally and no lesions were found P.M. It was calculated, after chemical analysis of the herbage, that

there is no danger, even of chronic poisoning, to sheep grazing pastures treated for the control of locusts. Sheep given the choice of treated and untreated pasture grazed more often on the treated pasture.—M.G.G.

BIERER, B. W. & VICKERS, C. L. (1959). The effect on egg size and production, of fungicide-treated and fumigated grains fed to hens.—*J. Amer. vet. med. Ass.* **134**, 452-453. **3616**

Hens fed for 23 days on oats treated several months previously with ethylene dibromide laid smaller, but not fewer eggs. Hens fed for 10 days on oats freshly treated with an amount ten times greater than that recommended by the manufacturer laid both smaller and fewer eggs, and some ceased laying; after 6 weeks on a normal ration the hens still laid smaller and fewer eggs than controls. —M.G.G.

ATERMAN, K. & DARLINGTON, D. (1959). A re-examination of the effect of vitamin B<sub>12</sub> concentrate on the hepatic injury produced by carbon tetrachloride.—*Brit. J. Nutr.* **13**, 168-177. [Authors' summary.] **3617**

Male rats, fed on a normal or a protein-deficient diet, were treated with single or with multiple injections of carbon tetrachloride. Their litter-mates were also given injections of vitamin B<sub>12</sub> and the effect of this treatment on the hepatotoxic actions of CCl<sub>4</sub> was studied, since a protective action of this vitamin has been claimed by some workers.

In contrast to these reports in the literature, vitamin B<sub>12</sub> was found to have no effect

on the histological picture, the fat content, or the survival time of acutely poisoned rats fed on a normal diet.

FORGACS, J., CARLL, W. T., HERRING, A. S. & HINSHAW, W. R. (1958). **Toxicity of *Stachybotrys atra* for animals.** —*Trans. N.Y. Acad. Sci. Ser. II.* **20**, 787-808. **3618**

Of 40 strains of *Stachybotrys atra* 26 caused intradermal reactions and 15 caused marked inflammation when culture filtrates were applied to the skin of rabbits. A substance extracted, by ether, from 2 strains caused hyperaemia, oedema and necrosis of the skin in rabbits, cattle and horses. This factor was absorbed by activated aluminium, it was eluted with chloroform or hot ethanol and was active at a conc. of 0.00175 µg./0.125 ml. Administered orally in olive oil, it caused no toxicity in the calf and horse (the oil may have prevented its absorption). The skin toxicity of ether extracts of the straw on which *S. atra* was cultured varied with the strain of fungus. A toxic factor in infected straw was insoluble in water but was rendered soluble by digestion with papain at pH 1.5. Straw on which one of the strains was cultured was toxic when fed to horses, calves, pigs and sheep. In horses it caused atypical poisoning characterized by a haemorrhagic diathesis. Sublethal amounts fed to a calf for 14 days caused leucocytosis, leucopenia and prolonged clotting time. Oats

on which this strain was cultured were toxic when fed to mice. Some strains produced the toxic factor only after serial passage on suitable media. It is, therefore, considered that strains isolated from suspected cases of fungotoxicosis should be carefully screened before ruling them out as causative agents.—T.E.G.R.

TORLONE, V. (1958). Contributo allo studio delle malattie da fotosensibilità negli animali domestici. II. Comportamento dell'istamina cutanea in ovini fotosensibilizzati con filloerytrina. [Photosensitivity in domestic animals. II. Behaviour of cutaneous histamine in phylloerythrin photosensitization in sheep.] —*Arch. Vet. Ital.* **9**, 481-494. [Summaries in English, French and German.] **3619**

In 4 lambs, aged 3 months, photosensitized with phylloerythrin (1 mg./kg.) and exposed to sunlight, skin hyperaemia appeared after 30 min. and oedema after 2 hours. The histamine content of the skin exposed to light was 42-66% lower than that of the skin protected from the light. The blood histamine content remained unchanged. Similar skin reactions and changes in the skin histamine content were observed in 3 lambs previously treated with 20 mg./kg. antihistamine. In view of this finding and of the sensitivity of sheep to histamine and antihistamine it is concluded that the skin changes in the experimental disease are not caused by histamine.—T.E.G.R.

## PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

STEVENS, C. E., HAMMOND, P. B. & NIELSEN, N. O. (1959). **Phlegmonous gastritis in cattle, resulting from ruminatoric doses of tartar emetic.** —*J. Amer. vet. med. Ass.* **134**, 323-327. [Authors' summary modified.] **3620**

A severe phlegmonous gastritis occurred following the administration of tartar emetic to a steer and 2 cows with anorexia and rumen atony.

Of 6 healthy calves starved for 36 hours, 4 were given atropine sulphate to induce rumen atony and 2 were controls: all were then given tartar emetic. The 4 test calves all developed phlegmonous gastritis; the controls did not. In the test calves anorexia and depression after dosage with tartar emetic appeared to be a direct consequence of the lesion.

It was concluded that tartar emetic should be given as a well-diluted drench, especially where there is anorexia with rumen atony.

CALDWELL, J. D., SUMPTION, L. J., ADAMS, J. C. & YOUNG, G. A. (1959). Comparative growth response of "disease-free" and diseased swine to iron administration. —*J. Amer. vet. med. Ass.* **134**, 287-290. **3621**

177 piglets from herds affected with virus pneumonia and atrophic rhinitis and 114 disease-free piglets were given courses of iron treatment. Iron did not improve the growth rate of the disease-free piglets. In the other group responses to iron-dextran injected i/m were better than those to iron given orally.

—M.G.G.

MOZGOV, I. E. (1959). Biogenic stimulators in veterinary science. —*Proc. XVIth Int. vet. Congr., Madrid* **2**, 47-50. **3622**

Biological stimulants have been used widely in the U.S.S.R. for the past 15 years. Not only do they stimulate the growth of

animals but they prevent and cure disease. Such preparations are cytotoxic sera (which are the blood sera of animals hyperimmunized against tissues such as spleen and bone marrow); preparations from various animal tissues and organs after exposure to 2°-4°C. for 6-7 days, or by fermentation and distillation to yield, for instance, the antiseptic stimulant of Dorogov (ASD), or treatment with "chloracide", or passing through heated air; extracts of aloe leaves, buttercup, sea estuary silt, the mycelium remaining from antibiotic production; and cultures in blood broth of an acidophilic bacillus (ABC) or of this bacillus and propionic bacteria (PABC).

Tables are given showing the favourable growth rate and low incidence of disease in young animals given these stimulants. ASD, plant preparations and Raysan preparation (a suspension of fine spleen tissue in isotonic saline soln. prepared after exposure to low temp.) are used for treatment of ulcers, chronic wounds, pyogenic bursitis, dermatitis and eczema, antireticular cytotoxic serum (ACS) stimulates healing of fractured bones and controls periostitis and periarthritis, ACS and ASD have their greatest effect in gastrointestinal diseases, and buttercup distillate is stated to cure epizootic lymphangitis of horses. Reproductive disorders and eye diseases also respond to these preparations.—M.G.G.

ANTALDI, G. G. V. & CAPPA, V. (1958). Sull'attività galattopoietica della L-tiroxina e della 3, 5, 3'-L-triodotironina. [Effect of thyroxine and triiodothyronine on milk production.] — *Atti. Soc. Ital. Sci. vet.* **12**, 230-233. [Summaries in English and French.] **3623**

Thyroxine, administered parenterally, was more effective in stimulating milk production

*See also absts.* **3367**, **3374** & **3410** (antibiotics); **3393-3394** (brucellosis); **3422** (coccidiosis); **3425** (haemosporidial infection); **3445** (virus and *E. coli* infection); **3497-3498**, **3515** **3517**, **3526**, **3529-3531** (anthelmintics); **3499-3506** & **3511** (parasiticides and insecticides); **3542-3543** (radiations); **3681** (book).

## PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

- I. DAWES, G. S. & MOTT, J. C. (1959). The increase in oxygen consumption of the lamb after birth.—*J. Physiol.* **146**, 295-315. **3626**
- II. CROSS, K. W., DAWES, G. S. & MOTT, J. C. (1959). Anoxia, oxygen consumption and cardiac output in new-born lambs and adult sheep.—*Ibid.* **316**-343. **3627**
- III. DAWES, G. S., MOTT, J. C. & SHELLEY, H. J. (1959). The importance of cardiac glycogen for the maintenance of life in foetal lambs and new-born animals during anoxia.

than when administered orally. By the latter route it had the same effect as triiodothyronine.

—T.E.G.R.

LOCK, J. A. & HARTHOORN, A. M. (1959). A note on the use of suxamethonium chloride (succinyl choline chloride) for the restraint of zebra.—*Vet. Rec.* **71**, 334. **3624**

The authors tested succinyl choline chloride as an intramuscular injection for the control of Grey's zebra. In the first case a dose of 1·0 mg. per estimated kg. body wt. was rapidly fatal. In the second case 0·8 mg. per kg. was given with apparent success but subsequent experience suggests that the animal did not receive the full dose. Two further animals had the dose of 0·8 mg. cut by 20% and again by 20%. Both these doses proved fatal. The next zebra received 0·1 mg. per kg., which caused only slight ataxia, but an hour later received 0·2 mg. per kg. In the latter case complete control of the animal was obtained, recovery occurring in 22 min. The action of the drug was exceptionally rapid.

—R. N. FIENNES.

MURRAY, J. R. (1959). Effect of chloral hydrate on growth of hair.—*Nature, Lond.* **183**, 984-985. **3625**

Chloral hydrate was injected s/c into 16 g pigs for 14 consecutive days, 8 receiving a dosage of 50 and 8 a dosage of 100 mg. per kg. body wt. There were 8 untreated controls. On the 15th day, all animals were depilated with a barium sulphate paste. After 24 hours the controls showed the usual rapid hair growth, but in the treated animals growth was inhibited. The inhibitory effect persisted for at least 7 days. No differences in effect were noticed between the two dose rates, nor between sexes.

—M.G.G.

—*Ibid.* **516**-538. [Authors' summaries modified.] **3628**

I. Umbilical blood flow was measured in foetal lambs. Foetal oxygen consumption was calculated from measurements of umbilical flow made with a velodyne flowmeter. Anoxia was induced by decreasing umbilical flow. Oxygen consumption decreased when umbilical arterial O<sub>2</sub> saturation fell below 50%; this was accompanied by a fall in blood pH, and a rise in blood lactate and CO<sub>2</sub>.

The rate of  $O_2$  consumption per kg. body wt. rose about threefold at birth, in some lambs within 6 hours, even though the lambs were anaesthetized and were not shivering.

It is suggested that an increase of at least this magnitude is necessary if the lamb is to maintain its body temperature after birth, since its  $O_2$  consumption/kg. in the uterus is similar to that of its mother, and since its surface area/kg. is three times that of its mother.

II. The new-born lamb required less chloralose to produce anaesthesia than the adult sheep.

The oxygen consumption of lightly anaesthetized adult sheep was well maintained when the  $O_2$  content of the inspired air was reduced to 6%.

In the new-born lamb at the neutral temperature and in the absence of shivering, there was a fall of up to 40%, varying according to the age of the lamb and the initial rate of  $O_2$  consumption.

Calculation suggests that cardiac output and systemic blood flow as well as pulmonary flow may have increased after birth.

Cardiac output per kg. body wt. was greater in the new-born lamb than in the adult sheep. Anoxia caused no significant increase in cardiac output in new-born lambs; there was a three to fivefold increase in adult sheep.

In a few very young lambs in which respiratory failure had suddenly occurred while breathing 10–15%  $O_2$ , prolonged artificial ventilation with air was required before spontaneous breathing was re-established.

The flow in the inferior vena cava was measured in new-born lambs; the calculated  $O_2$  consumption of the hind quarters decreased proportionately more than that of the whole lamb during anoxia.

When a new-born lamb was cooled so that it began to shiver,  $O_2$  consumption and the minute volume of respiration increased. A small reduction in the  $O_2$  content of the inspired air to 10–15% suppressed shivering and reduced  $O_2$  consumption to just below its initial level. In these circumstances there was only a transient increase in tidal air and respiration rate.

III. The ability of foetal lambs to survive anoxia was studied by recording the foetal blood pressure and heart rate continuously before and after tying the umbilical cords of lambs delivered by caesarian section under chloralose anaesthesia.

Foetuses of 83–91 days gestation age maintained their blood pressure above 16 mm.

Hg and their heart rate above 50 per min. for up to 60 min. after the umbilical cord had been tied; if the cord was untied within 40 min., the blood pressure and heart rate returned to their preanoxic levels. Older lambs, 126–146 days gestation age, maintained their blood pressure and heart rate for only 10–15 min. after the cord was tied. Adult sheep rebreathing nitrogen did not survive for more than 7 min.

The rates of anaerobic glycolysis in foetal lambs were compared by measuring the blood and tissue lactate and carbohydrate levels in unasphyxiated control lambs and in other lambs at various intervals after tying the umbilical cord. The initial rates of glycolysis in the tissues of the older lambs were either equal to or greater than those in the younger lambs. There was a correlation between survival time and the initial cardiac carbohydrate concentration in the lambs of each age group.

The cardiac carbohydrate concentration was measured in unasphyxiated new-born rats, rabbits and g.pigs of different ages; there was a linear relationship between cardiac carbohydrate concentration and the predicted time of survival in 100% nitrogen.

These results were discussed with reference to previous hypotheses as to the ability of very young animals to survive anoxia longer than adults. It was concluded that the maintenance of the circulation is of primary importance in anoxia.

ALEXANDER, G. (1958). Heat production of newborn lambs in relation to type of birth coat.—*Proc. Aust. Soc. Anim. Prod.* 2, 10-14.

3629

The heat production of 17 new-born Merino lambs was determined by closed-circuit indirect calorimetry at 68°F. during a period of 1 hour before suckling commenced.

When their fleeces were wet and a wind (10 m.p.h.) was directed onto them, the heat production of the lambs was 18 to 137% greater than when their fleeces were dry and there was no wind: the rectal temperature remained relatively constant. Heat from the environment contributed substantially to the evaporation of the water from the fleece, especially when the wool was long and coarse.

The experiments showed that new-born lambs can compensate for evaporative cooling of a wet fleece and thus maintain the body temperature by increasing their heat production considerably. Lambs with long, coarse birth coats expend less energy than those with short,

fine ones and so would have a better chance of survival in cold, windy weather.

—N. McC. GRAHAM.

BOLDIZSÁR, H. & PETHES, G. (1959). Relationship of plasma magnesium concentration to temperature regulation. — *Acta vet. Acad. Sci. hung.* 9, 19-26. [In English.] 3630

New-born puppies and rabbits without the ability to regulate body temperature were divided so that representatives of each litter were in each of 4 groups. Two groups were cooled to a colon temperature of 18° and 10°C. respectively in 25-40 min., a third group was similarly cooled for periods lasting over 1 hour, the fourth group being controls. The animals were bled at the end of the cooling period and plasma and erythrocyte magnesium estimated. The values for the new-born were less than those of adult animals. The puppies needed to be cooled for more than 1 hour before a significant increase of 28% in the level of plasma Mg occurred; an increase of 43% was found in the second group of rabbits and of 25% in the third group. Only in the third group of animals was a fall in the erythrocyte Mg level found. It was concluded that new-born herbivores and carnivores react similarly and that the plasma Mg level and heat regulation are not closely related.

—JOYCE E. HAMMANT.

BOWMAN, J. C. & ARCHIBALD, J. D. H. (1959). Effect of controlled lighting on production characters in the fowl. — *Nature, Lond.* 183, 1138-1139. 3631

The effect on egg production of various experimental lighting techniques is being tested on 3 farms. At Stewarton, Scotland, naturally reared pullets subjected at 23 weeks old to 6 hours of light a day increasing by 20 min. a week have shown a markedly delayed peak production compared with controls having 14 hours of light a day and will, by the end of the season, have a lower hen-housed egg production. At Glinton, Northamptonshire, birds were housed at 16 weeks, but otherwise similarly treated. Maturity (25% production) has been delayed by 36 days compared with controls, but mortality has been reduced, the coefficient of variation of egg production reduced and egg weight during the first 2-3 months is greater. At Lucan, Republic of Ireland, birds from 0-4 weeks old had 24 hours of light, from 4-12 weeks natural day length, and from 12-20 weeks, light was restricted to 6 hours a day. Light was then either increased

by 15 min. a week or raised to 14 hours a day. Although maturity was delayed by 6 days, all birds have reached a higher peak hen-housed egg production as well as having the previously mentioned advantages, and total egg production and percentage hen-housed production has been higher than in naturally reared controls.

—A. ACKROYD.

MEDWAY, W. & KARE, M. R. (1959). Thiocyanate space in growing domestic fowl. — *Amer. J. Physiol.* 196, 873-875. 3632

The space occupied by extra-cellular fluid, as calculated from the residue in plasma of i/v injected potassium thiocyanate, decreased from 61% of body wt. in week-old chicks to 26% in hens aged 32 weeks.—R.M.

I. ROWLAND, R. E., JOWSEY, J. & MARSHALL, J. H. (1959). Microscopic metabolism of calcium in bone. III. Microradiographic measurements of mineral density. — *Radiation Res.* 10, 234-242. 3633

II. MARSHALL, J. H., JOWSEY, J. & ROWLAND, R. E. (1959). Microscopic metabolism of calcium in bone. IV. Ca<sup>45</sup> deposition and growth rate in canine osteons. — *Ibid.* 243-257. 3634

III. MARSHALL, J. H., ROWLAND, R. E. & JOWSEY, J. (1959). Microscopic metabolism of calcium in bone. V. The paradox of diffuse activity and long-term exchange. — *Ibid.* 258-270. [Authors' summaries modified.] 3635

I. The range of microscopic calcium densities observed in man and in dog does not change with the age of the individual. The ranges, however, are not the same in the two species. New bone mineral in the dog is formed at higher density than similar mineral in man, and highly mineralized bone in the dog is more dense than the most dense bone in man. Thus species differences in calcium metabolism of bone do exist and should not be overlooked when comparing the uptake and retention of the alkaline earths in mammalian skeletons.

II. It was concluded that the intense concentrations of *in vivo*-deposited Ca<sup>45</sup> observed in canine osteons 12 hours or more after injection were due to accretion of calcium in appositional growth at approximately the specific activity measured in the large veins. The nature of the Ca<sup>45</sup> uptake in osteons which have completed or arrested appositional growth before injection could not be inferred from the data, but such uptake was of a magnitude less than that due to appositional growth. Com-

parison of calculated blood flow with observed osteon growth rate indicated that an osteon in the early stages of appositional growth accretes a large fraction of the calcium reaching it by its capillary.

III. By quantitative autoradiography and quantitative microradiography the diffuse uptake of  $\text{Ca}^{45}$  in highly mineralized bone in dogs many years old has been measured and identified primarily with long-term exchange of calcium. The rate of calcium transfer represents a significant fraction of the total calcium turnover in the skeleton of an adult dog and may play an important part in the calcium regulation of the blood. The possible implications for the distribution of long-term radiation dose to the skeleton due to internally deposited  $\text{Sr}^{90}$  or  $\text{Ra}^{226}$  are being examined. The observed rate of calcium transfer suggests that loss of  $\text{Ca}^{45}$  activity from highly mineralized bone by a process other than resorption should be just detectable over a period of a year.

CHERKASOV, V. A. (1959). [Influence of fluctuations in air temperature and humidity on the milk yield of high-yielding cows.]—*Veterinariya, Moscow* 36, No. 3 pp. 58-60. [In Russian.] 3636

C. studied relationships between milk yield, respiratory rate, air temp. and humidity in 43 cows in July. Milk yield was best at 22°C. and a relative humidity of 48%.—R.M.

LANK, R. B. & KINGREY, B. W. (1959). Electrocardiograms of normal, lactating dairy cows.—*Amer. J. vet. Res.* 20, 273-277. [Authors' summary modified.] 3637

Three electrocardiograms were made on each of 45 normal lactating cows, 2 to 12 years of age, and from non-pregnant to 7 months pregnant. Sinus arrhythmia occurred but this is not abnormal unless the cycle length fluctuates by 0·12 sec. or more. Electrocardiograms obtained from standard limb leads may be grouped satisfactorily according to the appearance of the QRS complex in lead II.

The appearance of the P and T waves was apparently not similar to that in man.

HERMENZE, F. & GOODWIN, W. J. (1959). Normal cholinesterase activity in the erythrocytes of cattle.—*J. econ. Ent.* 52, 66-68. [Authors' abst. modified.] 3638

The cholinesterase activity was determined in 160 samples of blood from 75 cattle of different breeds, ages and sexes. It was not affected by variations in ambient temperature.

The mean for beef cattle was 0·434 unit and for dairy cattle 0·410 unit. The difference was not significant at the 5% level of probability. The mean for the 14 groups of beef and dairy cattle was 0·422 unit.

CARE, A. D., MACDONALD, D. C. & NOLAN, B. (1959). Equilibration of labelled magnesium between sheep plasma and red cells.—*Nature, Lond.* 183, 1265. 3639

A known percentage of isotonic glucose containing carrier-free  $\text{Mg}^{28}$  was added to heparinized sheep blood and incubated at 40°C. with frequent aeration. After varying intervals the plasma and erythrocytes were separated and the  $\text{Mg}^{28}$  and total Mg content estimated. It was found that the rate of transfer of  $\text{Mg}^{28}$  across the erythrocyte membrane was 3·4% of the total plasma Mg/hour. This rate was unaffected by the blood pH level.

—JOYCE E. HAMMANT.

DOUGHERTY, J. R. (1959). A study of sheep gastric secretion using abdominal pouches.—*Thesis, Cornell* pp. 82. 3640

Studies were conducted to determine volume-rate, pH, peptic concentration and total peptic output of gastric juice secreted from abomasum pouches in sheep during prolonged fasting and after feeding. Additional experiments to indicate the magnitude of gastric secretion during normal feeding were also performed.

The gastric secretions were collected by a collection bag (the so-called Necheles abomasal pouch) attached to an abomasal pouch cannula.

In all six feeding experiments a slightly elevated level of secretion was noted in the late afternoon and evening, and in four experiments another similar wave of increased secretion was observed in the late morning.

Prior to feeding and during fasting the median pH, ranging from 1·29 to 2·32, was generally somewhat higher than when the animals were fed.

During food withdrawal up to 36 hours a substantially high level of peptic output was maintained.

Feeding was followed by a very definite decrease in median peptic concentration and a somewhat erratic, but significant, increase in median total peptic output.

—HERBERT L. GILMAN.

STEVENS, C. E. & SELLERS, A. F. (1959). Studies of the reflex control of the ruminant stomach with special reference to the eructa-

**tion reflex.** — *Amer. J. vet. Res.* **20**, 461-482. **3641**

The results are reported of a study of some aspects of the reflex control of rumino-reticular motility and eructation. In adult unanaesthetized cows with a rumen fistula, eructation was normally associated with most secondary contractions of the rumen, but about one third of the total number of eructations occurred in conjunction with a primary rumen contraction. It regularly occurred in conjunction with the contraction of the posterior rumen and the rate of eructation was found to correlate with the rate and amplitude of rumen contraction even when the cardia was exposed continuously to intraruminal gas. Procaine block of the cardiac sphincter appeared to allow a rapid eructation dissociated with rumen contraction. Afferent fibres for the eructation reflex were present in the dorsal abdominal vagus and afferent fibres for a rumination (regurgitation) reflex in the ventral abdominal vagus. The rate and amplitude of the rumino-reticular cycle and secondary rumen contractions were dependent, in part, on pressure or tension; the rate may also be dependent on the degree of tactile stimulation.

—A. ACKROYD.

**CLARKE, R. B. & McCALLION, D. J. (1959). Specific inhibition of neural differentiation in the chick embryo.** — *Canad. J. Zool.* **37**, 133-136. **3642**

Cell free homogenates of cerebra of recently hatched chicks suspended in Locke's solution were introduced into hen's eggs of 20-24 hour incubation through the yolk sac. Eggs were similarly injected with homogenates of chick muscle, mouse brain and mouse muscle. Statistical analysis of histological data indicated clearly that definite inhibitory effects characterized by abnormalities in brain development in the embryo resulted from the introduction of the chick brain homogenate into the developing egg. Brain abnormalities in embryos inoculated with the homogenates of other tissues were no more frequent than those found in untreated control embryos.

—R. V. L. WALKER.

**JONES, E. C. & KROHN, P. L. (1959). Influence of the anterior pituitary on the ageing process in the ovary.** — *Nature, Lond.* **183**, 1155-1158. **3643**

Mice of the CBA strain undergo a rapid depletion of their oocyte population with age, losing about 30% every 20 days. Animals

which were hypophysectomized at 39 days lost only 10% every 20 days: a significant difference. The 4 ovaries from 2 mice which had been hypophysectomized for 273 and 354 days respectively were orthotopically grafted one into an old female which had ceased to breed and one into each of three young adults. These mice were bilaterally ovariectomized in the same operation. The vaginal cycles of the old female continued to be infrequent and after 70 days the grafted ovary had enlarged, possessing follicles but no luteinization. This was attributed to a deficiency of luteinizing hormone in the aged pituitary. 2 of the young mice produced 3 and 2 litters respectively, the 3rd mouse exhibited repeated pseudopregnancies, hence the retarded ovaries were capable of normal development in a young environment. The aging of the ovary, as measured by loss of oocytes, was suggested to be dependent on at least 3 factors: (1) follicular maturation and ovulation, (2) a pituitary principle promoting oocyte atresia, and (3) a further principle, independent of the pituitary, which promoted a loss of oocytes in hypophysectomized mice.—JOYCE E. HAMMANT.

**TATA, J. R. & SHELLABARGER, C. J. (1959). An explanation for the difference between mammals and birds in their response to thyroxine and tri-iodothyronine.** — *Biochem. J.* **71**, No. 1, pp. 3P-4P of Proceedings. **3644**

The biological half-lives of thyroxine and tri-iodothyronine in the chicken were measured and a comparison made of the thyroxine-binding properties of avian and human sera. The half-lives were found to be identical (22.5 hours) in the chicken. The experimental work led to the conclusion that the difference in response to thyroxine and tri-iodothyronine in birds and mammals is due to fundamental differences in the mode of peripheral hormone transport.—D. S. PAPWORTH.

**REUBER, H. W. & EMMERSON, M. A. (1959). Arteriography of the internal genitalia of the cow.** — *J. Amer. vet. med. Ass.* **134**, 101-109. **3645**

5 first-calf cows (4-6 months calved) were used, slaughtered on the 1st, 3rd, 10th, 16th and 18th days of the cycle, and the arterial system was injected with a gelatin/glycerol/bismuth preparation and then X-rayed. A hitherto undescribed subserosal arterial plexus was revealed. The 10-day corpus luteum proved markedly more vascular than at other

ages. Helical vessels go to and from the follicles and these straighten to increase the blood flow in the follicular phase.

—F. L. M. DAWSON.

ARTHUR, G. H. (1959). The bovine allantois. *Vet. Rec.* **71**, 345. **3646**

Up to mid-term the allantoic cavity resembled a letter "T" on account of extensive fusion of the allanto-chorion and allanto-

amnion, but during the last few months of gestation the allantois widened progressively. This was presumed to be due to the pressure of the accumulating fluid. It was suggested that further separation of the fused membranes could occur during the second stage of labour, thus enabling the calf, like the foal, to be born in its amnion. 20% of calves are reported to be born thus.

—JOYCE E. HAMMANT.

*See also absts. 3662 (spermatozoa); 3682-3683 & 3685 (books).*

## PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

GROVE, D. C. (1959). Prevention of antibiotics in milk—present status.—*J. Dairy Sci.* **42**, 199-201. **3647**

Measures to prevent the occurrence of antibiotics in milk in the U.S.A. are (1) instruction of farmers in the prevention of mastitis through hygiene and good management, (2) a warning on the label of each container of mastitis preparation that milk must be discarded for 72 hours after treatment, (3) limitation of the quantity of penicillin in mastitis preparations to 100,000 units. If penicillin continues to appear in milk, more drastic steps will be contemplated, including its prohibition in the treatment of mastitis.

—M.G.G.

HARGROVE, R. E., PLOWMAN, R. D. & WRIGHT, W. W. (1959). Use of markers in veterinary preparations for the detection of antibiotics in milk.—*J. Dairy Sci.* **42**, 202-206. **3648**

Of several dyes tested for inclusion in mastitis preparations, a combination of 125 mg. of oil-soluble fluorescein and 125 mg. of uranine per dose of antibiotic appeared the most suitable. It could be detected visually in milk for 48 hours after infusion and with ultraviolet light for 96 hours or until the 7th-8th milking. No evidence of toxicity was seen in two cows given 8 times the prescribed dose, but 16 times the dose caused a slight swelling of the quarter in two of four cows. A loss of antibiotic activity was observed in 3 of 10 commercial preparations which, after addition of the dye, were stored at room temp. for 7 months. Despite these promising findings, it is pointed out that the use of dyes in mastitis preparations may be inadvisable, because of the risk of contamination of the milk by residues of dye.—M.G.G.

CIELESZKY, V. & KOVÁCS, F. (1958). Szarvasmarhák szentetrakloridos kezelésének hatása a tejre és tejtermékekre. [Effect of carbon

tetrachloride therapy on cows' milk and milk products.]—*Mag. állator. Lapja* **13**, 279-281. [In Hungarian. Summaries in English and Russian.]

**3649**

8 fluke infested milking cows weighing over 500 kg. were injected i/m with 40 ml. of equal volumes of carbon tetrachloride and liquid paraffin containing 1% procaine base. A significant drop in milk yield was observed only on the first day. In their milk carbon tetrachloride varying between 1·56-0·09 mg./litre was found and a taint was observed for three days. On the 8th day traces of  $\text{CCl}_4$  could only be demonstrated in the milk of two cows. The amount of  $\text{CCl}_4$  per kg. of total butter-fat of the 8 cows was 3·83 mg. on the first, 2·33 mg. on the second and 1·37 mg. on the third day. A description of the method for the extraction and determination of carbon tetrachloride is given.

It is suggested that the milk of animals treated with carbon tetrachloride can be used immediately for human consumption if adequately diluted.—A. SEBESTENY.

MONLUX, W. S. & MASON, D. T. (1959). Hemorrhage in the chuck of beef carcasses.—*Iowa St. Coll. Vet.* **21**, 135-137. **3650**

Haemorrhage was observed in the muscles of the chuck, particularly the spinalis dorsi, in fattened cattle slaughtered by the Jewish ritual method. It was associated with coagulation necrosis that had developed a few hours or a few days previously. Investigation of the food of the cattle revealed a danger of vitamin E deficiency. It is considered that the cause was a combination of excessive exertion and a deficiency of a substance, such as vitamin E or selenium, that regulates the metabolism of muscle.—M.G.G.

VAVAKO, D. (1959). [Veterinary services in Albania.]—*Veterinariya, Moscow* **36**, No. 4 pp. 79-81. [In Russian.] **3651**

A veterinary faculty was opened in 1951 and the former veterinary bacteriological lab. was enlarged into a veterinary research institute in 1957. The institute makes 25 biological products. Anthrax was controlled by the use of saponin spore vaccine and over a million animals were vaccinated in 1957. Enterotoxaemia of sheep caused by *Cl. welchii* Type C was first diagnosed in 1942: vaccination commenced in 1951. In the control of brucellosis in cattle and sheep, importance was attached to rearing youngstock free from the disease; there was no mention of immunization.

Infectious agalactia of sheep was a problem, and live attenuated vaccine was used to control outbreaks; severe infection in rams was reported. Abortion in sheep due to various causes sometimes affected on the average 10% of all ewes. Newcastle disease spread throughout the country in 1941 and a live Russian vaccine was used in attempts to control it. Bovine tuberculosis was not very common; clinically affected cattle were destroyed.—R.M.

CHENGÉ, P. (1958). Les services vétérinaires de la République Populaire de Mongolie et les maladies parasitaires du bétail. [Veterinary services in the Mongolian Republic.]—*Bull. Off. int. Epiz.* 49bis, Nos. 11-12 pp. 463-472. **3652**

The State Veterinary Service in the Mongolian Republic was set up in 1924. Before that date the livestock in the territory had been

*See also abst. 3684* (book).

#### REPRODUCTION AND REPRODUCTIVE DISORDERS

CHIEFFI, A. & MASOTTI, N. (1959). L'utilizzazione dell'acqua di cocco (*Cocos nucifera*) come mestruo diluitore. [Coconut milk as a diluent for bovine semen.]—*Zootec. e Vet.* 14, 95-103. **3654**

Survival of spermatozoa in coconut milk-egg yolk diluent was 60% after storage at 2° to 5°C. for 5 days. This survival rate was higher than that in egg yolk-citrate diluent.

—T.E.G.R.

STEHLE, E. (1958). Ein Beitrag zur Sperma-konservierung durch Kohlensäure. [Carbonic acid for preservation of semen.]—*Tierärztl. Umsch.* 13, 367-370. **3655**

S. tried the method described by Van Demark & Sharma [*V.B.* 28, 1258] in which diluted semen was saturated with CO<sub>2</sub> gas and

decimated by infectious and contagious diseases.

During the last 10 years sectors served by veterinarians have quadrupled and posts served by veterinary "assistants" have more than trebled. At present each province has 3-5 sectors under veterinarians and in each district there are 3-4 "assistants". The increase in veterinary personnel now makes mass vaccination against infectious diseases possible.

Among the most important parasitic diseases are helminth infestations, mange in sheep and camels and warble-fly in cattle. Control measures have greatly reduced morbidity and mortality in many of these diseases; it is hoped that complete eradication of rinderpest, anthrax and caprine contagious pleuropneumonia will soon be achieved; sheep pox and "epidemic pneumonia" of cattle are rare.—T.E.G.R.

WEIL, M. L. (1959). A recommended immunization program for veterinary laboratory personnel.—*Proc. 62nd Ann. Meet. U.S. Livestock Sanit. Ass., Florida*, 1958 pp. 324-331. [Author's summary modified.] **3653**

A vaccination programme for all veterinary diagnostic laboratory workers recommends protection against tetanus, poliomyelitis, smallpox, typhoid fever including paratyphoid A & B, and rabies. It is further recommended that workers at risk should be immunized against Q fever, typhus fever, Rocky Mountain spotted fever, tularemia, and Eastern and Western equine encephalomyelitis.

stored in sealed ampoules. Treated semen did not keep at room temp., but it retained good motility and fertility for at least 120 hours at 4°C.—R.M.

ROBINSON, T. J. & GONCALVEZ, L. (1959). An artificial insemination unit for the sheep.—*Aust. vet. J.* 35, 40. **3656**

A plan is given of a simple A.I. unit for use in a wool shed, which requires only one man for catching and holding the ewes, and permits rapid insemination of large numbers of sheep.—A. G. CULEY.

L. KVASNITSKII, A. V. & KONYUKHOVA, L. A. (1958). [Technique of artificial insemination of pigs.]—*Vestn. sel'skokhoz. Nauk* 3, No. 3, pp. 89-95. **3657**

II. KVASNITSKII, A. V. & KONYUKHOVA, L. A.

(1958). [Results of artificial insemination of pigs.] — *Ibid.* No. 5, pp. 68-76. [In Russian. Summaries in English and German.] 3658

I & II. The authors described a technique for A.I. in pigs which they named fractional insemination. The optimum volume of semen for one insemination was 15-20 ml. and diluent was added to make a final volume of 40 ml. for gilts and 50 ml. for sows. The diluent consisted of 3 g. glucose and 0·45 g. NaCl to 100 ml. water. Of 34 sows inseminated 29 conceived. The average number of piglets was 12.—R.M.

MADDEN, D. H. L. (1959). Progress in the artificial insemination of swine—some factors influencing fertility levels in its field application. — *Vet. Rec.* 71, 227-233, & 234. [Author's summary modified.] 3659

Inseminations in Hampshire in 1957 are analysed. Results had improved compared with those of earlier work. One factor had been the more accurate assessment of oestrus in the sows. The first heat after weaning was probably more fertile than subsequent heats. If the first heat occurred within 5 days of weaning, fecundity was probably greater than if it occurred later. The optimal time for insemination was probably towards the end of the first day of heat. No indication of lowered fertility through the attenuation of the semen through age was observed up to 7 hours old. Large White boars produced higher fertility and larger litters than Landrace boars. Average litter sizes and fertility may be interrelated.

HAFS, H. D., HOYT, R. S. & BRATTON, R. W. (1959). Libido, sperm characteristics, sperm output, and fertility of mature dairy bulls ejaculated daily or weekly for thirty-two weeks.—*J. Dairy Sci.* 42, 626-636. [Abst. from authors' summary.] 3660

Ten aged bulls were used. After 4 weeks (preliminary) in which semen was collected once a week from each bull, five were chosen at random for ejaculation once a day and five once a week for a 32-week test period.

The results indicated that daily ejaculation of aged bulls for as long as 8 months is not harmful, either to their health or to the quality of the semen. Ejaculating bulls two or three times on each of two or three days a week and storing the semen in an improved diluent, such as the 20% yolk-citrate-glycine-glucose diluent described by Foote *et al.* (1958), makes

it possible to provide unfrozen semen with satisfactory fertility at all times from most stud bulls.

ARMSTRONG, D. T. & HANSEL, W. (1959). Alteration of the bovine estrous cycle with oxytocin. — *J. Dairy Sci.* 42, 533-542. [Authors' summary modified.] 3661

Daily administration of oxytocin to heifers in the first week of the oestrous cycle shortened the dioestrous period, and the next heat occurred 8-12 days after the previous oestrus, instead of the usual 21 days. These precocious heat periods appeared normal in every respect, being followed by ovulation at the expected time. The subsequent dioestrous periods were of normal length. The corpora lutea formed during treatment failed to attain the expected size and contained fewer normal luteal cells and more connective tissue. Concurrent injections of prolactin failed to overcome the action of oxytocin in shortening dioestrus. Daily injections of progesterone prevented heifers treated with oxytocin from returning to oestrus until 4-6 days after the injections ceased. It is concluded that the effects of oxytocin were due to inhibition of the normal function of the corpus luteum, possibly by interference with the secretion of a luteotrophic hormone from the anterior pituitary. Oxytocin was less effective in shortening dioestrus when atropine or reserpine was administered concurrently, and did not induce precocious oestrus in hysterectomized heifers.

DAUZIER, L. (1958/59). Physiologie du déplacement des spermatozoïdes dans les voies génitales femelles chez la brebis et la vache. [Physiology of movements of spermatozoa in the genital tract of the ewe and the cow.] — *Ann. Zootech.* 7, 281-306, & 8, 5-37. 3662

D. studied the speed of movement of spermatozoa up the genital tract in 62 ewes of 4 French breeds and in 10 cows and concluded that in both species passage from the vagina to the distal part of the oviduct took 8 hours. He also studied the survival and fertilizing ability of spermatozoa in the genital tract of the ewe and physiological mechanisms which aided the movement of spermatozoa up the genital tract. While motility of the spermatozoa was essential for their passage through the cervix and oviducts, muscular contractions of the uterus were their principal means of transport in the horns of the uterus. Ram spermatozoa retained their fertilizing ability for 30 hours, after

coitus, and ova remained fertile for 15 hours after ovulation. Applications of the findings to artificial insemination were discussed.—R.M.

SHELESNYAK, M. C. (1959). Fall in uterine histamine associated with ovum implantation in pregnant rat.—*Proc. Soc. exp. Biol., N.Y.* 100, 380-381. [Author's summary modified.] 3663

Bioassay of the uterus in pregnant rats revealed a fall in the concentration and content of histamine during the 24 hours preceding the implantation of blastocysts.

MCLAREN, A. & MICHEL, D. (1959). Studies on the transfer of fertilized mouse eggs to uterine foster-mothers. II. The effect of transferring large numbers of eggs.—*J. exp. Biol.* 36, 40-50. [Authors' summary modified.] 3664

Post-mortem examinations were made at 16½ days post coitum of the uterine contents of mice belonging to five groups: untreated controls; controls receiving 'dummy' transfers of saline without eggs; test animals receiving 5-10 fertilized eggs ('low' group); 15-20 eggs ('middle' group); 25-30 eggs ('high' group). All transfers were made into the left uterine horn 2½ days after mating the recipient to a fertile male. Genetic markers enabled embryos to be distinguished by eye colour.

The transfer operation did not affect the pregnancy rate, nor the implantation rate in the uninjected horn.

The yield of live embryos of donor origin showed a systematic improvement in all three groups throughout 18 weeks of the experiment, rising from about 7% of eggs transferred at the beginning to about 36% at the end. The percentage yield was not affected by the number of eggs transferred.

The implantation of transferred eggs inhibited the implantation of native eggs in the same horn, but not in the opposite horn. Embryonic mortality in the injected horn was about doubled by the transfer operation, but was unaffected by the number of eggs transferred.

McMANAMNY, L. F., MURNANE, D. & PULLAR, E. M. (1959). A comparison of a modified Aschheim-Zondek, and the toad (*Bufo marianus*) test in equine pregnancy diagnosis.—*Aust. vet. J.* 35, 29-38. 3665

The standard Aschheim-Zondek test was modified by using one test mouse instead of three and its efficiency compared with that of the toad spermatogenesis test. The modified

test was more reliable than the toad test which, in general, was unreliable, and of no value as a supplementary test.—R. G. WALES.

DEWAR, A. D. (1959). Observations on pseudopregnancy in the mouse.—*J. Endocrin.* 18, 186-190. [Author's summary modified.] 3666

From 20 to 50% of sexually mature female mice, grouped together in large cages but segregated from males since weaning, were found to be pseudopregnant as indicated by suppression of oestrus, vaginal mucification, weight changes and mammary development. Such 'extra-coital' pseudopregnancies occurred independently of experimental handling in grouped females but were also observed, although much less frequently, in isolated mice subjected to daily examination.

The duration of pseudopregnancy was longer and much more variable than has previously been suggested.

BIDDULPH, C., MARTIN, M. S., BECKER, S. C. & MCSHAN, W. H. (1959). Succinic dehydrogenase and adenosine-triphosphatase activities of corpora lutea, ovarian interstitial tissue and endometrium from pseudopregnant rabbits and rabbits treated with gonadotrophic hormones.—*J. Endocrin.* 18, 125-131. 3667

When superovulation was induced in rabbits by administration of pituitary gonadotrophin, the corpora lutea weighed less and succinic dehydrogenase activity of the endometrium was lower than in pseudopregnant rabbits. These changes may be responsible for the high mortality of embryos in superovulating rabbits.—R.M.

BUTAEVA, T. M. (1958). [Action of carbachol and oestrogenic preparations on the uterus of cows under experimental and clinical conditions.] — *Proc. Lenin Acad. agric. Sci.* 21, No. 11 pp. 34-37. [In Russian.] 3668

In 43 cows uterine contractions were recorded by means of a balloon introduced into the uterus by laparotomy. The action of carbachol, sinestrol [? stilboestrol] or folliculin [oestrone], administered parenterally two hours after laparotomy, was to increase uterine contractions regardless of the stage of the oestrous cycle. The optimum therapeutic doses of these drugs for increasing uterine contractions were 1 ml. of a 0.1% soln. of carbachol/100 kg. body wt., 1 ml. of a 1% oily soln. of sinestrol per 100 kg. and 15,000 mouse units of folliculin. Action of the drugs persisted for 2.5, 3 and 12 hours respectively. Carbachol administered s/c 3 times in one day was

recommended for the treatment of "functional" infertility. Good results were claimed for the treatment of chronic endometritis with sinestrol and carbachol combined injected 3 times at intervals of 48 hours.

—R.M.

UNDERWOOD, E. J., SHIER, F. L., DAVENPORT, N. & BENNETS, H. W. (1959). Further studies of the effects of prolonged injections of stilboestrol on the ewe.—*Aust. vet. J.* 35, 84-87.

The effects of prolonged administration of stilboestrol (0·01, 0·03 and 0·09 mg./ewe/day) were studied. Little effect was noted on incidence of oestrus but 0·03 mg. stilboestrol daily for six months caused a high incidence of infertility and dystokia. Infertility was even higher following a second six-month treatment. Persistent cysts occurred in the endometrium of ewes receiving the 0·03 and 0·09 mg. dose rates.—R. G. WALES.

Dow, C. (1959). Experimental reproduction of the cystic hyperplasia-pyometra complex in the bitch.—*Proc. XVIth Int. vet. Congr.*, Madrid 2, 273-274.

Histological examination showed that the cystic hyperplasia-pyometra complex of bitches could be divided into 4 groups: (1) cystic hyperplasia alone, (2) with acute endometritis, (3) with plasma cell infiltration, and (4) chronic endometritis. Almost 90% of affected animals were over 6 years old and 80% were nulliparous. All clinical cases occurred during metoestrus, corpora lutea being present in the ovaries in all except one case. In castrated bitches, cystic lesions similar to those in the natural disease could be produced by daily injections of 10 ml. of progesterone for 60 days but not by oestrogens. Similar cystic lesions could also be produced after 4 artificial cycles, and further cyclic treatment resulted in endometrial fibrosis. Raising the daily dosage of progesterone to 25-50 mg. in the 6th cycle produced all the typical symptoms of acute endometritis during the period of progesterone treatment. In these experimental cases of acute endometritis, the plasma cell lesion was observed if progesterone treatment was stopped, whilst chronic endometritis could be produced if the uterine horns were tied and progesterone stopped.

—A. ACKROYD.

AVELLINI, G. (1959). Le cardioangiopatie congenite nei bovini. (Rassegna bibliografica ed osservazione personale). [Congenital diseases

of the circulatory system in cattle (bibliographical review and personal observations).] —*Vet. Ital.* 10, 86-107. [Summaries in English and French.]

3671

Literature on congenital deformities of the heart and the larger blood vessels is reviewed and an account is given of a congenital defect in a calf; this consisted in an incomplete ventricular septum and persistent ductus arteriosus.—T.E.G.R.

I. JØRGENSEN, S. K. (1959). Congenital porphyria in pigs.—*Brit. vet. J.* 115, 160-175.

3672

II. WITH, T. K., CLAUSEN, H. & HØJGAARD-OLSEN, N. J. (1959). Undersøgelser over kongenit porfyri hos svin. [Congenital porphyria in pigs.] —*Beretn. Forsøgslab. Kbh.* No. 310 pp. 40. [In Danish. Summary in English.]

3673

I. This is an English version of a paper previously published in Danish [*V.B.* 26, 3982].

II. Breeding experiments were performed with offspring of the cases in Danish Landrace pigs described by Jørgensen [*V.B.* 26, 3982]. It was not yet possible to define the mode of inheritance—it may be transmitted through apparently normal but latently affected pigs. Although affected pigs had discoloured bones, it was probably so slight as to escape detection at meat inspection. A convenient method of diagnosis was determination of porphyrin in the incisors of new-born pigs: the normal content was below 1 µg./g. while in porphyria it was above 25 µg./g. A qualitative test was based on red fluorescence of porphyrin when a solution obtained by dissolving extracted teeth in HCl was examined by Wood's light. To eradicate the condition only male piglets which passed this test should be selected for breeding.—R.M.

DYRENDAHL, S. & HENRICSON, B. (1959). Hereditary gingival hyperplasia of silver foxes.—*Proc. XVIth Int. vet. Congr.*, Madrid 2, 887-889.

3674

As a result of importation from Norway of a young male silver fox with very good quality fur, a hyperplastic condition of the gingiva has become widespread amongst silver foxes in Sweden. Swelling of the gums, which are slightly paler than normal, can first be seen when pups shed their milk teeth. Ultimately a confluent cauliflower-like tumour mass develops in 2-3 years which completely covers all except the highest crowns. Genetic analysis showed that the condition is inherited,

probably as a simple recessive characteristic with incomplete penetrance. Males predominate in affected animals. A positive correlation was observed between the gingival lesion and good quality fur.—A. ACKROYD.

ASHTON, G. C. & McDougall, E. I. (1958). **Beta-globulin polymorphism in cattle, sheep and goats.**—*Nature, Lond.* **182**, 945-946. **3675**

Comparison of the number and position of  $\beta$ -globulin zones in paper and starch gel

*See also absts.* **3550** (effect of nutrition); **3696** (book).

### ZOOTECHNY

GEHRING, K. (1959). Zur Zucht und Haltung der weissen Maus. III. Der Einfluss verschiedener Futtermischungen auf Produktivität und Wachstum. [Breeding and management of white mice. III. Influence of various food mixtures on reproduction and growth.]—*Zbl. VetMed.* **6**, 185-208. [Summaries in English, French and Spanish.] **3676**

*See also absts.* **3546** (visceral lymphomatosis); **3688** (book).

### TECHNIQUE AND APPARATUS

*See absts.* **3350** (test for mastitis); **3364** (c.f.t. for Johne's disease); **3337** (typing of salmonella by fluorescent antibody); **3338** (ring test for brucellosis); **3430** (conservation of F. & M. disease antigen for c.f.t.); **3437** (gel diffusion test for rabies); **3439** (cultivation of vaccinia virus); **3461** (electron microscopy of lymphatic leucosis virus); **3608** (liver biopsy); **3610** (urometer); **3656-3658** (artificial insemination); **3665** (pregnancy diagnosis); **3687** (book, surgery).

### BOOK REVIEWS

REVO, M. V. & ZHUKOVA, M. D. (1958). [Veterinary microbiology.] pp. 456. Moscow: Gosud. izd. sel'skokhoz. literature. 12r. 13k. (10s. 6d.) [In Russian.] **3677**

This new textbook covers in some detail general and special microbiology, with descriptions of the most important bacteria, fungi and viruses. Thanks to indexes of Russian and Latin names and an 11-page glossary of technical terms, the book forms a useful dictionary of Russian bacteriological nomenclature.—R.M.

ISAACS, A. & LACEY, B. W. [Edited by.] (1959). Virus growth and variation. Ninth symposium of the Society for General Microbiology held at the Senate House, University of London, April 1959. pp. viii+272. Cambridge: University Press. 35s. **3678**

The rise in conceptual importance of viral nucleic acids is represented by real advances at the fundamental level in cytochemical knowledge. The analysis of structural and functional alterations within the virus-infected cell exercises the ingenuity of virologists to-day,

electrophoresis of sera of cattle, sheep and goats showed that the different phenotypes in these animals can be distinguished by paper electrophoresis on the basis of the  $\beta$ -globulin components of different mobilities although in some heterozygous sera, components are superimposed. In the goat,  $\beta$ -globulins appear to be controlled by two allelomorphs  $\beta^A$  and  $\beta^B$  giving rise to 3 genotypes and 3 phenotypes. This hypothesis was supported by breeding experiments.—A. ACKROYD.

Growth and reproduction of mice fed on the cube diet of Bahner (1953) were as good as in those fed on diet 41. Provision of milk to drink increased the number of young, but increase of the dried whole milk content of both diets to 20% did not improve reproduction and growth, except that weaning weights were a little higher.—M.G.G.

simultaneously diminishing any division between biochemistry, biology and genetics.

It is this biochemical enquiry into the mode of virus growth and variation and its method of altering cell structure to further replication which dominates the trend throughout this collection of scholarly papers.

An important step forward has been the isolation of infective viral ribonucleic acid (RNA). This is emphasized by recent studies indicating that the RNA contains the requisite information for virus replication. This agrees with the tentative hypothesis that protein synthesis proceeds obligatorily *via* RNA.

Viral interference is projected as a number of different mechanisms induced by damaged nucleic acids, with interferon as the product of abnormal viral synthesis.

The limitations and uses of fluorescence microscopy are discussed with the suggestion that viruses beyond the range of the bright-field microscope may be visualized by fluorescence.

A number of specific virus growth studies are reported. Viral synthesis is visualized as

occurring in stages, each stage to be possibly detectable serologically and, sequentially, by means of isotope labels; their nature could then be evaluated afterwards.

—J. H. DARBYSHIRE.

WALKER, D. L., HANSON, R. P. & EVANS, A. S. [Edited by.] (1958). *Symposium on latency and masking in viral and rickettsial infections. The Proceedings of a Conference held at the University of Wisconsin Medical School, September 4, 5 and 6, 1957.* pp. xi + 202. Minneapolis: Burgess Publishing Company. \$4.75. **3679**

The Conference was convened to discuss the mechanisms of inapparent virus infections of animals, insects, plants and bacteria in which the presence of the virus is often difficult to demonstrate, and to clarify terminology relevant to latent infection in these systems. Contributions by workers who had studied types of inapparent infections in animals, insects and plants showed clearly that several mechanisms are responsible for persistence of infection and difficulty in demonstration of virus. Neo-natal infection of mice with lymphocytic choriomeningitis virus provided an example of inapparent infection in which large amounts of infectious virus persist indefinitely without producing disease. This is ascribed to the phenomenon of immunological tolerance by which an immune response does not develop, and evidence is presented which suggests that the disease produced when older mice are infected with the virus is due to an immune reaction. The difficulty of demonstration of infectious virus in the lesions of Shope's rabbit papilloma was formerly attributed to a masked state of the virus but appears in fact to result from insufficient concentration of virus to infect rabbits readily. Other persistent infections are attributed to a balance between virus growth and inhibitors of virus growth, antibodies and non-specific substances present in the tissues. These varied patterns contrast with the more precise and compact knowledge of persistent phage infections in bacteria. This difference is chiefly because phage-bacteria interactions are studied at the cellular level whereas infections of animals and plants are normally studied in terms of their effects upon the animal or plant as a whole. This difference of approach is partly bridged by studies of animal viruses in cell cultures. Latent infections of cells *in vitro* have been achieved with several animal viruses, e.g. Newcastle, poliomyelitis and adenovirus,

chiefly by the addition of antibody to the tissue cultures. There is no evidence yet of latent infections in which the genetic material of an animal virus becomes attached to the genetic material of cells to give provirus in a way which resembles the attachment of the genetic material of lysogenic phage to bacterial genetic material to give prophage. Phage studies and the tissue culture approach to the study of animal viruses require a terminiology at the cellular level distinct from the terminiology at the level of organized animals. The following definitions are suggested:

**"Inapparent infection** covers, at the host-parasite level, the whole field of infections which give no overt sign of their presence. **Subclinical** can be used as an alternative, particularly in human medicine.

**Latent infections** are inapparent infections which are chronic and in which a certain virus-host equilibrium is established. The adjective 'latent' is best reserved to qualify 'infection': the term 'latent virus' being avoided.

**Occult virus** is used to describe the cases where virus particles cannot be detected and in which the actual state of the virus cannot as yet be ascertained. It is preferred to 'masked', since this word has been used in a number of contradictory meanings.

Whenever it has been shown that viruses of animals or higher plants go through cycles as described for bacteriophage, the terms **provirus**, **vegetative virus** and **infective virus** are appropriate for the corresponding stages. Infective virus is the fully formed virus particle.

**A moderate virus** (corresponding in some measure to a temperate phage) is one growing in a cell while still permitting its continued survival and multiplication; a **cytoidal** one kills the cell; **submoderate** covers intermediate cases. (Some viruses may be moderate in one cell-system, cytoidal in another.)"

—A. W. GLEDHILL.

MANNINGER, R. & MÓCSY, J. (1959). *Spezielle Pathologie und Therapie der Haustiere. I. Infektionskrankheiten. II. Organkrankheiten. [Hutyra & Marek's special pathology and therapy of domestic animals. Vol. I. Infectious diseases. Vol. II. Diseases of organs.]* pp. xii + 956 & xix + 1004. Jena: Gustav Fischer. 11th revised Edit. DM 128. **3680**

This edition comes five years after the previous one [see *V.B.* 26, 671] and incorporates advances published up to the end of 1956. The main improvements are in the quality

of the paper, which is now excellent, and in layout and typography, and although the size has increased a little, the price remains unchanged at an equivalent of roughly £10. Many chapters have been enlarged, including leptospirosis in pigs and horses and bovine vibriosis. New sections in volume I deal with contagious necrotic enteritis of piglets, virus abortion in cattle, mucosal diseases of cattle (described briefly with bluetongue), epidemic tremor in chicks and vibriosis in sheep. In volume II (diseases of organs) recent treatments such as diethylcarbamazine and cyanacethydiazide for lungworms and organic phosphorus insecticides for warble flies have been included. There has been much re-arrangement in both volumes to suit modern requirements.

The old illustrations have been improved and new ones added. The many errors in the spelling of Russian synonyms of disease names in the 10th edition have been corrected. This famous book retains its lead as the most comprehensive and up-to-date work on diseases of domestic animals and will be an indispensable aid to those who can read German.—R.M.

STEPHENSON, H. C. & MITTELSTAEDT, S. G. [Edited by.] (1959). *Veterinary drug encyclopedia and therapeutic index. A listing of veterinary drugs, biologicals and foods, and feed additives of American manufacturers.* pp. lxiv + 474. New York: Drug Publications, Inc. 7th Edit. 3681

This is a list of American proprietary preparations, arranged alphabetically under their trade names. The so-called therapeutic index refers to drugs only by their trade names, and there is no index of official or approved names, so that it is difficult or even impossible to discover what forms of a given drug are available unless one is conversant with the great variety of trade names. This book will be of very limited use to veterinarians outside the U.S.A.

—R.M.

KUMMER, B. (1959). Bauprinzipien des Säugerskeletes. [Functional anatomy of the mammalian skeleton.] pp. xi + 235. Stuttgart: Georg Thieme. DM 45. 3682

Form and function is related to morphological development, and with four-legged including domestic animals it is related more dramatically to accommodating posture. Skeletal evidence obviously plays a large part, and the author has taken the opportunity to review particularly the vertebral column, the pelvic girdle and a few long bones of which

the femur figures most prominently. Of this bone, for example, comparisons are made of detailed structure relative to strength, and much is discussed on the nature of the femoral head and neck relative to the long axis of the shaft. Of the vertebral column comparisons are made with bridge construction as was practised by d'Arcy Thompson and Gregory. Experimental tests of structural forms are recorded and references made to X-rays. Numerous line drawings illustrate the text and an extensive bibliography is given.

—C. W. OTTAWAY.

SCHENCK, M. & KOLB, E. (1959). *Grundriss der Physiologischen Chemie für Veterinärmediziner, Humanmediziner und Biologen. [Outline of physiological chemistry for veterinary surgeons, doctors and biologists.]* pp. xv + 333. Jena: Gustav Fischer. 3rd Edit. DM 23.80. 3683

This well-produced text-book will be found of value by those interested in the study of the chemical structure of the human or animal body, the qualitative and quantitative determination of its components, and the chemical reactions taking place within living tissues. Written jointly by two professors of physiological chemistry, one a physician, the other a veterinarian, the subject matter is arranged in fifteen main chapters, headed respectively: Basic physical and chemical principles. Elementary inorganic constituents of the body. The simpler organic constituents. Carbohydrates. Fats. Proteins. Vitamins. Hormones. Enzymes. Metabolism. Body fluids. The liver. The skin and its excretions. Connective and supporting tissues. Muscle and nerve tissues. For the benefit of students there is an appendix covering the whole of the subject matter in the form of over 500 questions. There is an adequate subject index.

—E.G.

SHUR, I. V. [Edited by.] (1959). [Handbook on veterinary inspection of the products of slaughtered animals and on the hygiene of meat production.] pp. 687. Moscow: Gosud. izd. sel'skokhoz. literature. 23r. 40k. [In Russian.] 3684

This entirely new book, the work of 14 authors, replaces the book of Vol'ferts (last edition 1950) as the standard Russian work on meat technology and meat inspection. The 33 chapters cover all aspects of abattoir work and marketing of meat and fish; 5 of them describe

diseases which may be encountered at meat inspection. There are 9 coloured plates, one of which shows erosions on a human hand claimed to have been caused by foot and mouth disease. At the end of the book there are bibliographies to each chapter.—R.M.

HAMMOND, J. (1959). *Progress in the physiology of farm animals. Supplement.* pp. 1047-1116. London: Butterworths Scientific Publications. **3685**

This supplement is actually Chapter 22, written by C. W. Emmens, of the whole work (volume 3) edited by Dr. Hammond [V.B. **27**, 2874]. It comprises a review of progress in the whole subject of male fertility, including that in laboratory and domestic animals, artificial insemination, and the evaluation of semen samples. In general the supplement is a highly competent piece of work; the author has made important original contributions to the subject and his knowledge of the literature is adequate. The critically-written section on semen testing strikes the reviewer as pre-eminent. It is pleasant to see the importance appreciated of an adequate interval between calving and service. Perhaps inevitably, some of the discussions are beginning to be out-of-date by the time the book is published. Thus, there have been interesting developments announced in the application of the Illini variable temperature diluent, on glycine as a diluent additive, and on the question of semen production rate in bulls as measured by exhaustion tests (*e.g.* Almquist, 1958). Valuable suggestions for future work are made in the sections on deep-freeze and semen evaluations. Notable omissions are any discussion of the bacteriology of normal bull semen, and of the question of bulls whose semen "does not freeze well".

Exception might be taken to Emmens' failure to refer to the suggestive work on the role of the cervix, in considering survival of spermatozoa in the female tract, and to the somewhat exaggerated importance attached to the capacitation phenomenon, in relation to present knowledge both in the rabbit and in the larger domestic species.

—F. L. M. DAWSON.

LLOYD, C. W. [Edited by.] (1959). *Recent progress in the endocrinology of reproduction. Proceedings of the conference held in Syracuse, New York, June 9-12, 1958.* pp. xi+532. New York (& London): Academic Press Inc. \$12.00. **3686**

This book consists of 23 chapters, each dealing with a different aspect and each having a detailed reference list and a discussion of moderate length. Twelve chapters deal with laboratory animals, ten with man, while two include some work on sheep and cattle. The conference was attended by 32 workers, including 9 British and 4 Australian. Of the 32, 14 represented lines of research in pure physiology, 13 were medical and 5 had an agricultural or veterinary background.

The quality of the papers and of the discussions is very high, each is packed with information and makes reference to from 30-155 papers. An inevitable result is to reduce readability; thus there are many diagrams, tables, and photomicrographs which do not merely supplement the message of the text, but without which it would be unintelligible.

—F. L. M. DAWSON.

BOLZ, W. (1959). *Lehrbuch der allgemeinen Chirurgie für Tierärzte und Studierende.* [**A text-book of veterinary surgery.**] pp. xv + 516. Stuttgart: Ferdinand Enke Verlag. 3rd revised Edit. DM 69. **3687**

This new edition has retained the general layout of the previous edition [V.B. **21**, 3117]. Many chapters have been partly revised and brought up to date particularly with regard to the use of antibiotics in surgery, tissue transplantation and grafting, blood transfusion and plasma substitutes and modern treatment of fractures. The number of illustrations has been increased by 26 to 341, most of which are from photographs and of exceptionally good quality.—E.G.

BONNIER, G. & TEDIN, O. (1959). *Biologische Variationsanalyse. Die statistischen Methoden zur Auswertung biologischer Versuche, insbesondere auf dem Gebiet der Tierzucht.* [**Variation analysis in biology, with special reference to its use in animal breeding.**] pp. 204. Hamburg (& Berlin): Paul Parey. DM 28. **3688**

This is a German translation of the second edition of the Swedish book "Biologisk variationsanalys" which was published in 1957. It describes fundamental statistical concepts and gives examples of calculations commonly employed in biological experiments. It is written for those who wish to acquire an elementary knowledge of the subject, in order to evaluate experimental data without resorting to complicated methods.—R.M.

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### ABBREVIATIONS OF NAMES OF PUBLICATIONS

The abbreviations used in *Index Veterinarius* and *The Veterinary Bulletin* are those of the *World List of Scientific Periodicals published in the years 1900-1950*, 3rd Edit. (1952), London: Butterworths Scientific Publications.

The transliteration of Cyrillic characters is that given in  
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SEPTEMBER, NOVEMBER

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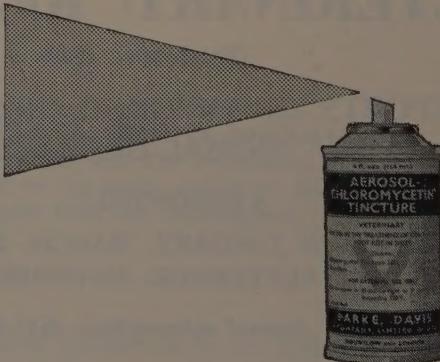
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